

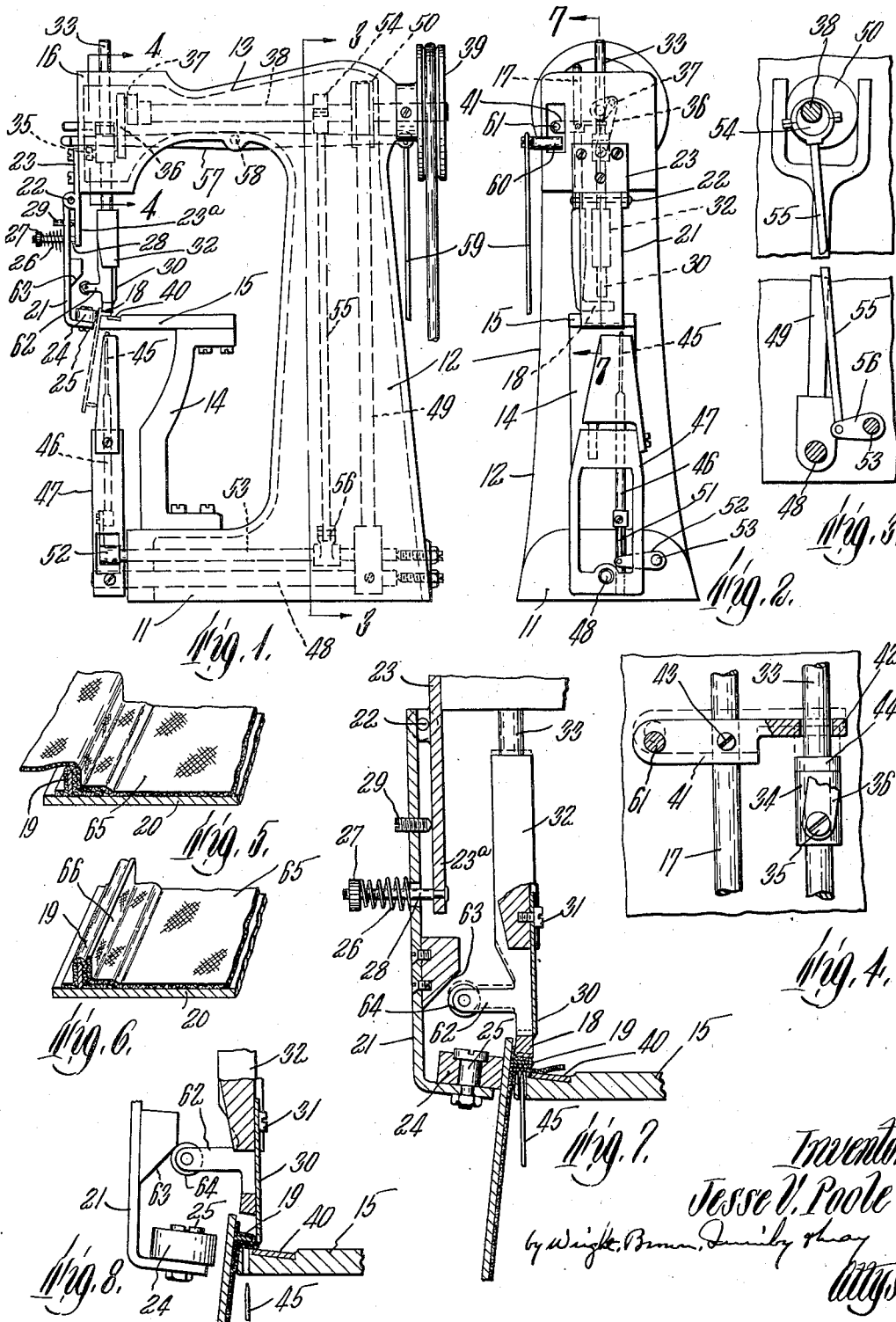
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TRIMMING MACHINE

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TRIMMING MACHINE

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The subject matter of this invention is a machine for trimming or cutting off the irregular edges of fabric applied to an article of manufacture. It is particularly designed to operate upon ribbed innersoles which have been reinforced by the adhesive application of a sheet of fabric to the surface of the innersole within the rib, and against the inner face or wall of the rib. The reinforcing fabric, after being thus applied to the innersole and stretched across its surface and crowded into the interior angle of the rib, extends smoothly over the surfaces to which it has thus been applied, but its margins project across the top of the rib in a puckered irregular condition. The machine is designed and adapted to cut away the surplus parts of the reinforcing fabric along a line approximately flush with the upper edge of the rib.

In its embodiment herein illustrated, the machine is equipped with work supporting and gripping means which grasp between them the rib and the portion of an innersole from which such rib projects, together with a reciprocating knife which cooperates with an abutment to sever the reinforcing material adjacent to the edge of the rib, and means for feeding the work and releasing the gripping pressure intermittently in time with the operations of the knife and during the periods when the knife is withdrawn from the cutting abutment.

In the drawing of the embodiment above referred to,—

Fig. 1 is a side elevation of the machine;

Fig. 2 is a front elevation;

Fig. 3 is a partial vertical section on line 3—3 of Fig. 1;

Fig. 4 is a detail section on line 4—4 of Fig. 1;

Figs. 5 and 6 are perspective views of a fragment of an innersole illustrating the character of work performed by the machine;

Fig. 7 is a sectional view taken approximately on line 7—7 of Fig. 2, showing the work in position between the grippers for operation; and

Fig. 8 is a fragmentary view similar to Fig. 7 showing the gripping members separated from one another in the position assumed for placing and removing the work.

Like reference characters designate the same parts wherever they occur in all the figures.

The frame of the machine comprises a base 11, a post 12, and a lateral arm 13 extending from the top of the post and overhanging the base, these parts being made of any suitable construction, but conveniently being a single metal casting with interior open spaces adapted to ac-

commodate the working parts. A bracket 14 is secured to the base and rises therefrom, carrying on its upper end a forwardly projecting arm or table 15 constituting a work support.

The overhanging arm 13 terminates in a head 16 having bearings in which there is reciprocally mounted an upright bar or rod 17. This bar carries at its lower end a presser foot 18 directly over the outer extremity of the work support 15; these two elements constituting grippers adapted to grasp between them the stitch receiving rib 19 (Figs. 5 and 6) of a ribbed shoe innersole 20. A third gripping element is comprised by an arm 21 pivoted at 22 to a plate or bracket 23, which is secured to the forward side of the head 16, and arranged to bear on the outer side of an innersole opposite to the bite of the gripping elements 15 and 18. Preferably the part of arm 21 which thus bears on the work is a roll 24 connected by a pivot 25 to the inwardly bent extremity of the arm. A spring 26 presses the gripper arm toward the other two gripping elements; said spring being confined between the outer side of the arm and an abutment 27 in the form of a nut adjustably screwed on a rod 28 which projects forwardly from a downward extension 23a of plate 23, passing through a hole in the plate and being surrounded by the spring. Adjustment of the abutment nut 27 regulates the force with which the gripper arm bears on the work. Movement of this arm under pressure of the spring is limited by a stop screw 29 threaded through the arm in position to abut against the extension 23a.

The cutting implement is a knife 30, connected detachably by a screw 31 to a block 32 on the lower end of an upright bar 33 which reciprocates in bearings in the head 16. A collar 34, adjustably secured on this bar by a set screw 35 (see Fig. 1) is connected by a link 36 to a crank pin 37 on a shaft 38 which rotates in bearings in the upper part of the machine frame and is driven by a belt pulley 39. The knife travels in a path contiguous to the rear face of the presser foot 18 so that it is in effect guided by the presser foot, and its position with respect to the stroke of its operating crank 37 is so adjusted, (with the aid of the sleeve 34 and set screw 35) that the cutting edge on its lower end is brought forcibly at each stroke against the upper side of the work support 15. An inlay 40 is set into the upper side of the support and is the part thereof against which the knife abuts. It constitutes in effect an abutment or cutting block for the knife. It is of softer material than the

cutlery steel of which the knife is preferably made, so as not to injure the cutting edge, but is at the same time hard enough to hold the fabric to be trimmed firmly against the thrust of the knife and to sustain a multiplicity of impacts from the knife without being penetrated itself. I have found that brass or bronze forms a most satisfactory reaction element for this purpose. It is an important feature of the machine, because it assures severance of the material to be cut, when such material is duck rendered more than normally flexible by a coating of plastic adhesive, which cannot be satisfactorily severed by a reciprocating shear blade cooperating with a stationary shear blade.

When the knife withdraws, the presser foot is withdrawn to release the work and permit feeding. A spring, not shown, constantly acts on the presser foot, forcing it toward the work table. A cross bar 41 is secured rigidly to the presser foot bar 17 and has an arm 42 which is forked or perforated to receive the knife carrying bar 33 above the collar 34 thereon. Cross bar 41 may be adjusted on the presser bar and secured by a set screw 43. It is positioned so that as the knife bar rises, but before reaching the top of its stroke, a buffer 44 on sleeve 34 bears on the arm 42 and lifts it, thereby raising the presser foot. The lift thus given need be slight at most, (just enough to leave the work free of gripping pressure), and preferably is of little more than the minimum sufficient for this purpose, in order to leave the presser foot in position to act as an abutment for the feeder which intermittently advances the work, as presently described. The dotted lines in Figs. 4 and 7 show a normal and sufficient amount of lift for this purpose.

Feeding is accomplished by a pointed pin 45 beneath the work support, protruding upwardly from the upper end of a bar 46 which reciprocates endwise in a rock arm 47. The rock arm is secured at the front end of the base to the protruding end of a shaft 48 which is pivoted in the base and is oscillated by an attached arm 49 receiving motion from an eccentric or cam 50 on the shaft 38. The feeder pin bar is connected by connecting rod 51 with an arm 52 secured to a parallel shaft 53 in the base and oscillated by an eccentric 54 on shaft 38, with which it is connected by a rod 55 and arm 56, substantially as shown in Fig. 3. The eccentrics 50 and 54 are so related to crank 37 that the feeder pin is raised and the rock arm 47 is swung laterally in one direction while the knife and presser foot are raised, and the feeder pin is withdrawn and swung in the opposite direction while the presser foot bears on the work and the knife makes a cutting stroke. The movement of the feeder pin is sufficient to bring its point into the under side of the innersole rib 19 when the presser foot is raised to the extent previously described, and to withdraw the point entirely from the rib when the latter is forced down on the work support by the presser foot.

During the feeding strokes, when the presser foot is only slightly raised, the gripper arm 21 exerts a constant pressure on the outer side of the work piece sufficient to hold the rib fully advanced within the grip of the support and presser foot. But this arm is withdrawn to permit changing the work, when the presser foot is raised excessively for the same purpose. For thus raising the presser foot, a lever 57 is pivoted at 58 to the overhanging arm 13 of the machine frame and its rear arm is connected by a link 59 with a

treadle not shown, but located beneath the bench on which the machine is installed. The forward arm of lever 57 carries a finger 60 underlying a stud 61 on the cross bar 41, and so positioned that when the treadle is depressed, the presser foot is raised to about the height shown in Fig. 8, which is referred to for convenience of description as an excessive height in proportion to the rise which suffices for feeding of the work. When the presser foot is thus raised, a projection 62 on its forward portion engages a cam 63 on the rear side of the confining arm 21 and displaces the arm forwardly as shown. Preferably the engaging element between this projection and cam is a roll 64 on the extremity of the projection.

An innersole before being trimmed by this machine has an appearance substantially as shown by Fig. 5. A sheet 65 of fabric (commonly called Gem duck in the shoe making art) is adhesively united to the face of the innersole and to the inner side of the rib 19, and is tucked into the inner angle of the rib. The surplus marginal part of the fabric sheet projects at random beyond the top of the rib. The innersole is then applied to the machine when the movable grippers are withdrawn, so that the inner side of the rib rests on the work support and the adjacent face of the innersole bears on the end of the work support. Then the movable grippers are released and caused by their springs to bear on the work as shown in Fig. 7. Upon then setting the machine in operation, it automatically trims off the surplus material of the reinforcement, close to the edge of the rib by a succession of cutting strokes of the knife and intermediate actions of the feeding means as previously described. This operation produces the result shown in Fig. 6, in which the upstanding part 66 of the reinforce is trimmed off on a line parallel with the edge of the rib.

What I claim and desire to secure by Letters Patent is:

1. A machine for trimming reinforcing fabric on a ribbed innersole in a line conforming substantially to the edge of the rib thereof, said machine comprising a support and a complementary gripper adapted to clamp such a rib between them, a third gripping element organized to bear on the side of such an innersole opposite to the rib so gripped, and a knife arranged to reciprocate adjacent to the first named gripper into contact with the work support and away from the work support.

2. A trimming machine according to claim 1 and including further means for releasing the first named gripper and simultaneously feeding the work a step when the knife is thus withdrawn.

3. A cutting machine comprising a frame structure having a stationary work supporting table, a pressure foot movable toward and away from the upper side of said table, a knife movable toward and away from the same side of the table in close proximity to the pressure foot and having a cutting edge on its end next to the table, a work feeder beneath the table comprising a swinging arm and a reciprocatable feeder pin carried by the arm and adapted to be advanced toward the presser foot for engaging the work and to be withdrawn therefrom, means for reciprocating said knife and raising the presser foot when the knife withdraws from the work support, and means for swinging the feed arm and reciprocating the feeder pin in time with the movements of the presser foot so as to propel the work in one direction when the presser foot is raised and return to starting position without

engaging the work when the presser foot is lowered.

4. A cutting machine comprising a frame structure having a stationary work supporting table, a presser foot movable toward and away from the upper side of said table, a knife movable toward and away from the same side of the table in close proximity to the presser foot and having a cutting edge on its end next to the table, a work feeder beneath the table comprising a swinging arm and a reciprocable feeder pin carried by the arm and adapted to be advanced toward the presser foot for engaging the work and to be withdrawn therefrom, an additional presser adjacent to the outer extremity of the table and spring means urging the last named presser toward said extremity in a direction substantially parallel to the supporting surface of the table.

5. A cutting machine comprising a supporting structure including a work support, a knife mounted to reciprocate toward and away from said work support and into contact with the nearer surface thereof, said knife having a cutting edge at its end next to the work support, a presser foot beside the path of the knife arranged to bear with spring pressure against the same side of the work support as the knife, means for reciprocating the knife, connections by which said knife reciprocating means withdraws the presser foot from the work support when the knife is so withdrawn, a gripper normally spring pressed toward the work support in a direction transverse to the movements of the knife and presser foot, operator-controlled means for giving to the presser foot an excess movement of withdrawal from the work support, and provisions by which the presser foot in the course of such excess movement causes displacement from the work support of said gripper.

6. A cutting machine comprising a work supporting table, a knife bar guided to move endwise in a path transverse to said table, a knife carried by the knife bar projecting toward the table and having a cutting edge on its extremity, automatic mechanism for reciprocating said bar and knife, a presser organized to exert yielding pressure toward the table in an area closely beside the knife extremity upon work supported by the table, a feeder at the opposite side of the table from the knife and presser, and means for actuating said feeder to thrust against the work toward the presser and to move laterally while in engagement with the work, said knife bar and presser having interengaging means or-

ganized to relieve the presser from the work when the knife is near its limits of withdrawal from the table.

7. An innersole rib trimming machine comprising a table formed to support the stitching rib of an innersole and to engage at its end the body part of such a sole adjacent to the base of such rib, a presser arranged to cooperate with the table in gripping such a rib, a knife guided to reciprocate beside said presser toward and away from the rib supporting surface of the table and having a cutting edge on its extremity nearest to the table, and means for reciprocating said knife so as to cut off against the table so much of the rib as protrudes from the contiguous side of the presser.

8. An innersole rib trimming machine comprising a table having a supporting surface and an outer bounding face adapted to enter the angle between the body and stitching rib of a ribbed innersole and to support such rib on the supporting surface of the table, a presser foot yieldingly forced toward the table in a position to bear on an innersole rib supported as set forth, a feeder having work engaging means adapted to advance into contact with the opposite side of the innersole rib from that engaged by the presser foot and to travel along the work supporting surface of the table while so engaged with the rib, a knife supported and guided to reciprocate beside the presser foot into and out of contact with the supporting face of the table and having a cutting edge at its extremity nearest to the table, automatic means for so reciprocating the knife and automatic means for operating the feeder in the manner described when the knife is withdrawn from the table, and means whereby the knife in its withdrawal also withdraws the presser foot sufficiently to permit displacement of the work by the feeder.

9. A machine for trimming the ribs of innersoles comprising a table having an extremity formed and located to enter the inner angle between the body and rib of an innersole, so that such a sole may be placed against said extremity with the rib projecting over the upper side thereof, a presser mounted over the table and guided to move toward and away therefrom to cooperate therewith in gripping the innersole rib, a knife, and means for effecting such relative movement between the knife, table and innersole as to cause the knife to trim the innersole rib by incising it against the table.