April 8, 1930. S. J. FINN 1,753,406

TRIMMING MACHINE

Filed Aug. 9, 1928 3 Sheets-Sheet 1

Fig. 1.

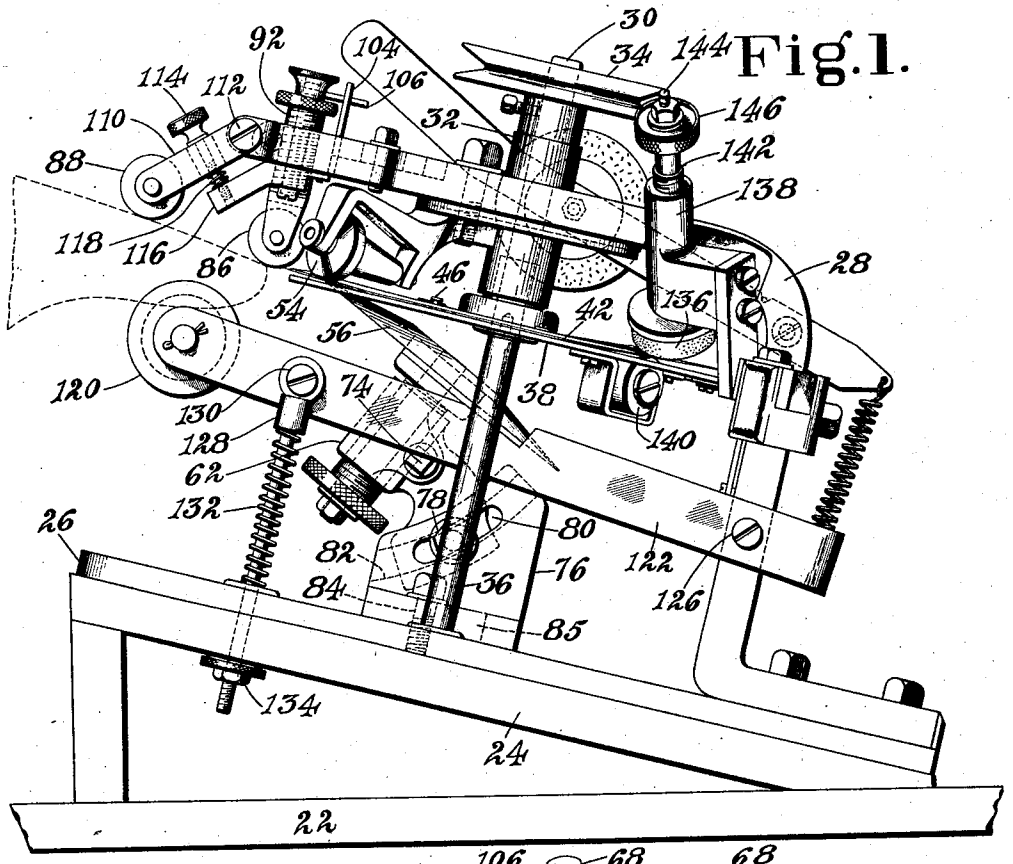
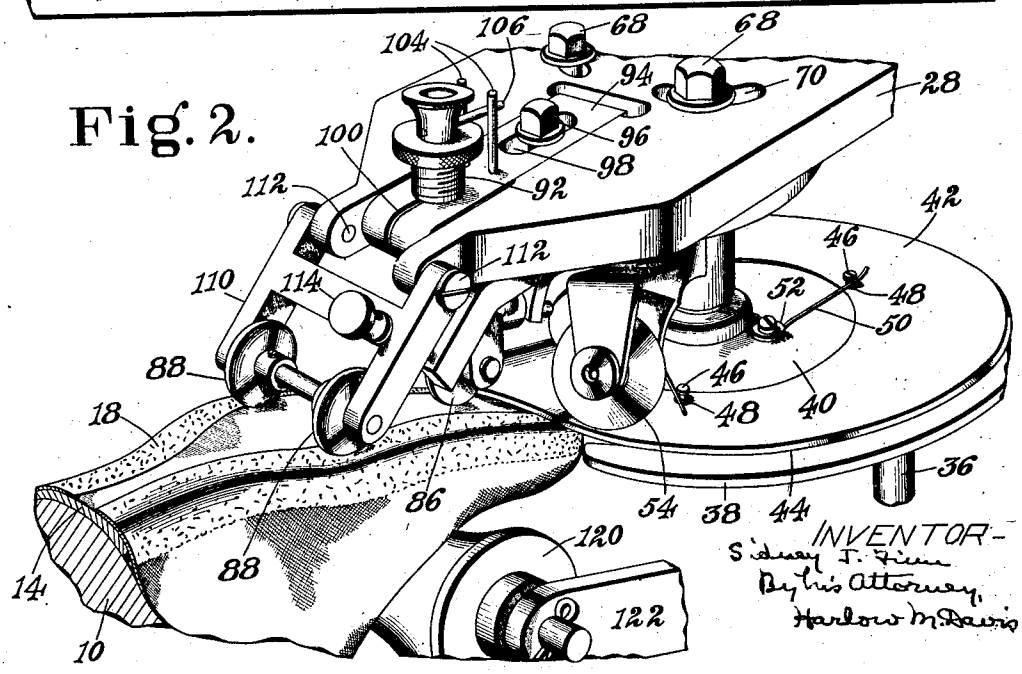


Fig. 2.



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Fig.3.

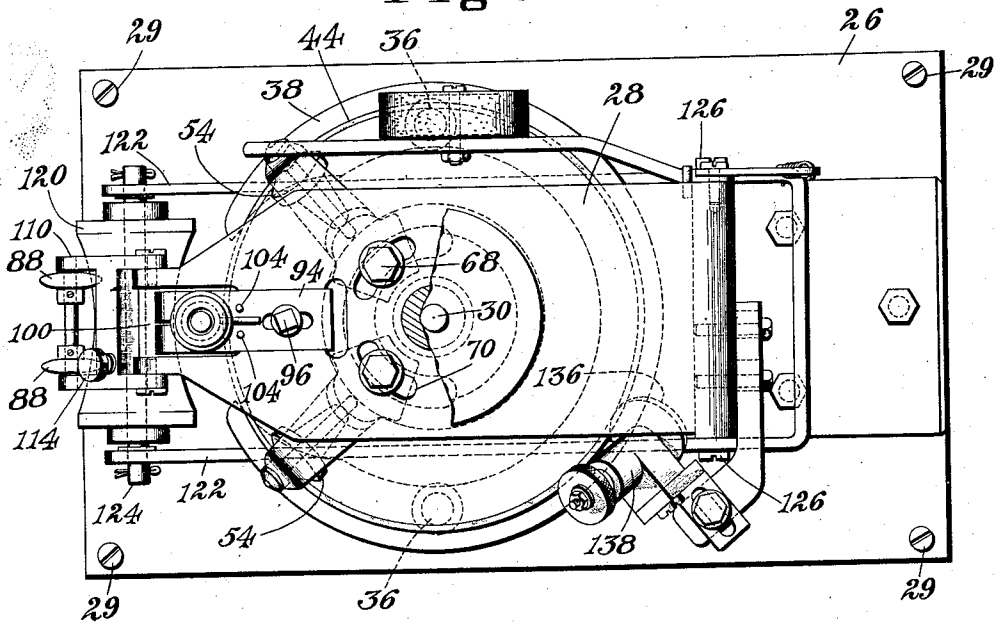
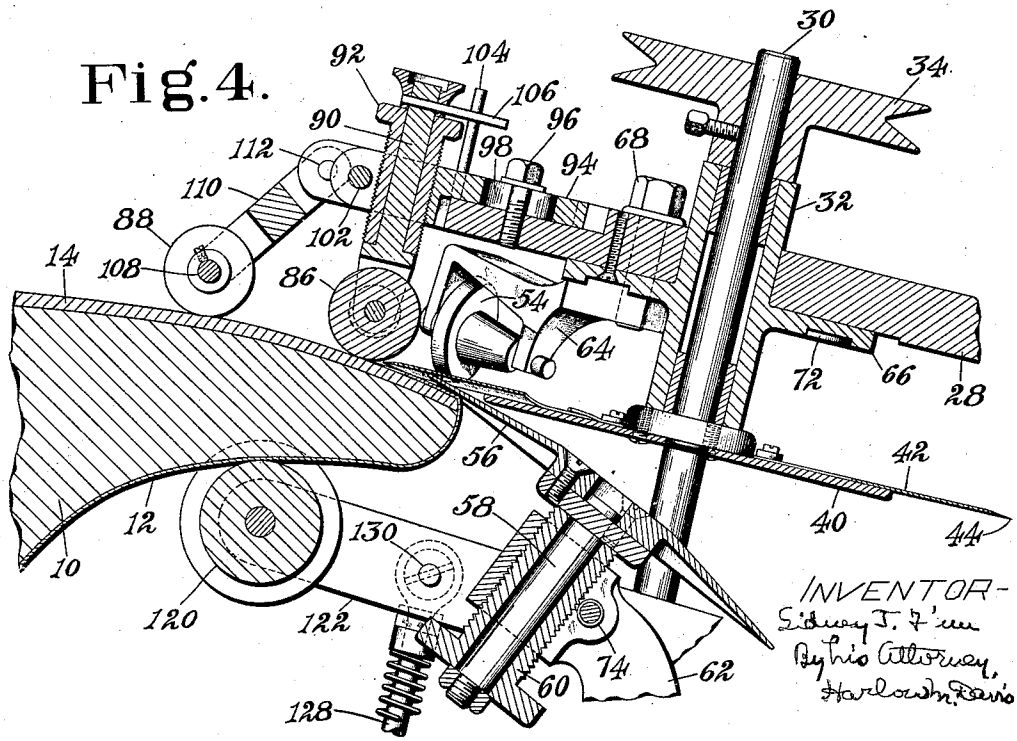


Fig.4.



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Fig. 5.

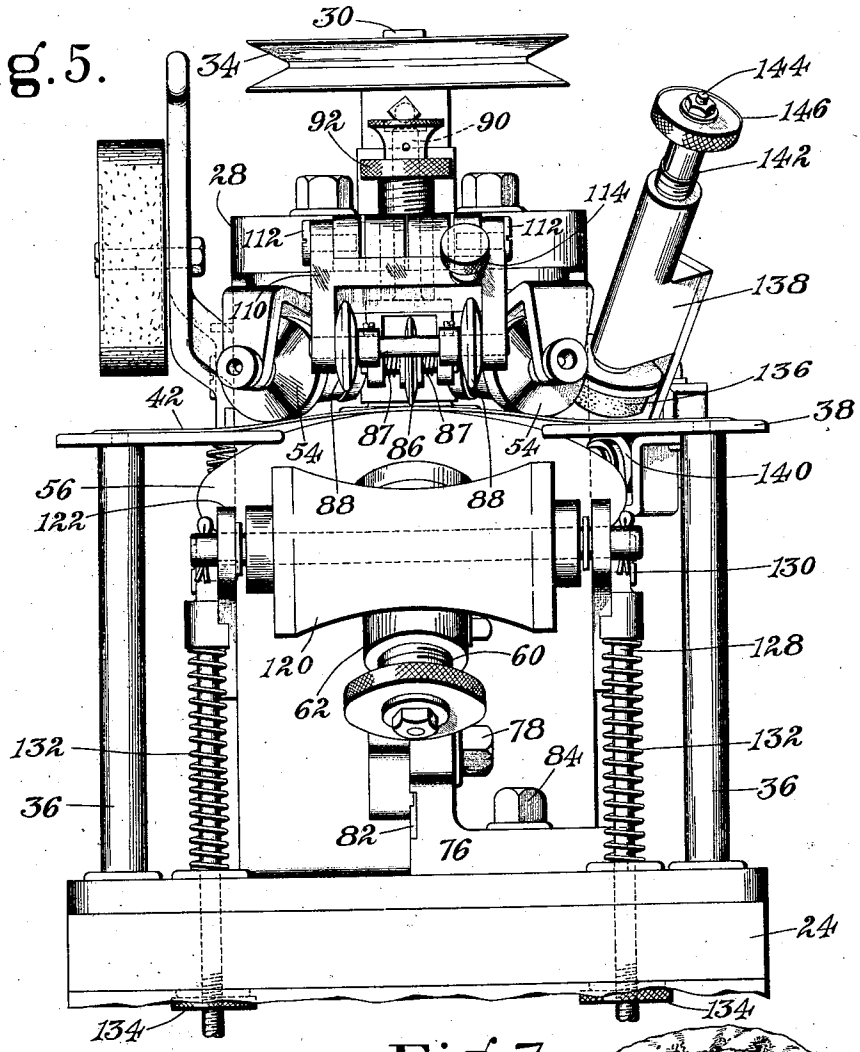


Fig. 6.

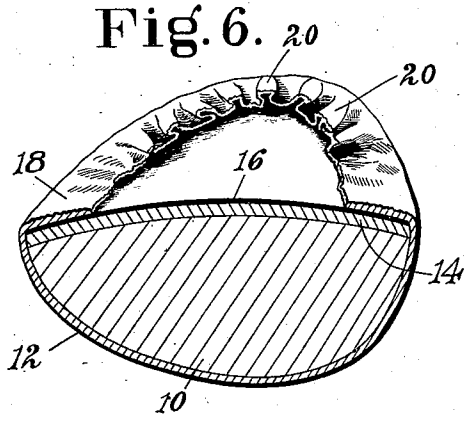
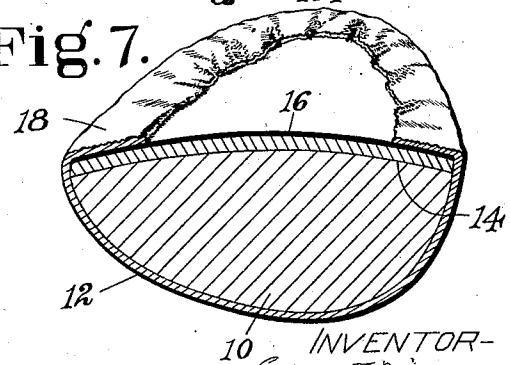


Fig. 7.



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UNITED STATES PATENT OFFICE

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TRIMMING MACHINE

Application filed August 9, 1928. Serial No. 298,594.

This invention relates to trimming machines and is illustrated as embodied in a machine adapted to trim surplus material from the bottoms of shoes.

In the manufacture of canvas shoes of the sneaker type, rubber outsoles are secured by a process of vulcanization to the insoles and to the overdrawn margins of the canvas uppers of lasted shoes, but to insure strong bonds of adhesion of the rubber soles to the margins of the uppers, as well as to insure evenness of the rubber outsoles it is necessary to trim lumps of surplus material from the overdrawn margins before the outsoles are laid. Briefly described, the method of procedure is as follows: an insole and a canvas upper are assembled on a last, the bottom face of the insole being coated with an adhesive; the upper is pulled over and lasted, and the overdrawn marginal portion thereof is pressed against the adhesive-coated surface of the insole and maintained in the desired position by adhesion alone, since no tacks, staples or similar fasteners are used in shoes of this type; the lumps formed by pleats in the overdrawn margin of the upper, due to crimping the margin around the toe of the last, must then be trimmed off nearly if not quite flush with the smooth, relatively flat portions of the overdrawn margin to provide a smooth, even foundation surface for a rubber outsole; a fresh coating of adhesive is applied to the bottom of the insole and to the overdrawn and trimmed margin of the upper; and a rubber outsole is laid and ultimately vulcanized to the lasted shoe.

Various types of trimming machines have been proposed for trimming off the lumps or pleats formed in lasting the toe ends of such shoes. For example, a trimming machine illustrated in U. S. Letters Patent No. 1,576,835 granted March 16, 1926 on application of A. F. Littlefield comprises, among other things, a rotary trimming cutter embodying a dished formation whereby a segment of the cutting edge is caused to conform substantially to the transverse curvature of the bottom of a lasted shoe so that the cutter may trim the right and left margins of a shoe simultaneously, beginning at the toe end and progressing toward the heel end. Dished cutters of the type above described require molding in a forming press and must be made of steel of sufficient thickness to be rigid throughout, since they are supported only at their centers and have considerable radial projection beyond their points of support. Accordingly, cutters of that type are relatively costly, and since frequent sharpening operations shorten their useful life the users of such cutters are confronted with a considerable expense for replacement.

In view of the conditions above described, an object of the present invention is to provide an improved trimming machine in which economy, with respect to cutter expense, may be obtained, and in which the cutter may be curved and regulated to conform to curvatures of the articles of work.

In accordance with this object the invention provides for using a thin, flexible cutter driven so that its cutting edge will travel lengthwise to execute a draw cut, and also provides anti-friction means relatively to which the cutter moves for imparting an abnormal curvature to the cutting edge of a work-engaging portion of the cutter so that the curvature of that portion may conform to a surface curvature of an article of work. As illustrated, the cutter is a normally flat, annular disk provided with a circular cutting edge at its perimeter. The manufacturing cost of these cutters, as well as the quantity of steel required, is considerably less than that of pressed or formed cutters of the type illustrated in the Littlefield patent. In the machine illustrated herein, three abutments are arranged to deflect a segment of the cutter from its normal plane, two of these abutments being arranged to engage one face of the cutter in tandem relation while the third is arranged to engage the opposite face of the cutter at a point between the radii at which the two tandem abutments have contact with the cutter. The abutments maintain a sinuous wave in the cutter so that the cutting edge is constrained to describe a sinuous path of travel and they are preferably relatively adjustable to regulate both the height and the length of the wave.

Another object of the invention is to provide improved means for driving a flexible cutter, to the end that the cutter may undergo flexure independently of its connection with the driving means.

Accordingly a novel feature of the invention consists in a flexible cutter and driving means provided with cooperative pins and holes forming an articulated driving connection that enables the cutter to waver or deviate from a normal path of travel. When, as herein shown, the pins are carried by the driving means and the holes are formed in the cutter, the cutter may creep back and forth on the pins while it is being driven by them.

The features hereinbefore referred to and other novel features of the invention are hereinafter described and claimed.

Referring to the drawings;

Fig. 1 is a side elevation of a trimming machine in which the novel features of the invention are embodied, the front of the machine being at the left of the figure, and the toe portion of a lasted shoe being represented by broken lines;

Fig. 2 is a perspective view showing the trimming means, trimming gages and a portion of a lasted shoe in operative position;

Fig. 3 is a top plan view, partly broken away, of the machine shown in Fig. 1;

Fig. 4 is a vertical section on a larger scale showing the trimming means and a lasted shoe in operative position;

Fig. 5 is a front elevation of the machine;

Fig. 6 is a perspective view of the toe section of a lasted shoe that requires trimming; and

Fig. 7 is a view similar to Fig. 6 showing the same shoe after it has been trimmed by a machine of the type herein disclosed.

As a preface to a detailed description of the illustrated embodiment of the invention, a brief description of a typical example of work will be given. Figs. 6 and 7 illustrate the construction of a canvas shoe of the sneaker type and including the following elements: a last 10, a canvas upper 12, and an insole 14 the outer face of which is provided with a coating 16 of adhesive, such as a quick-drying cement. In the process of lasting the shoe the overdrawn margin 18 of the upper is pressed against the coating 16 of adhesive and is thereby held without any other means. As a result of crimping the flange 18 around the toe of the last pleats 20 are formed on the bottom of the shoe as shown in Fig. 6. These pleats constitute lumps that must be trimmed off nearly if not quite flush with the unpleated portions of the flange to provide a suitable foundation surface for a rubber outsole. The machine hereinafter described is adapted to sever the pleats 20 with this result, as shown in Fig. 7.

It is to be observed that the bottom of the last 10 has a transverse convexity and that the insole 14 and the overdrawn flange 18 of the upper are conformed to this convexity. It will be pointed out that the cutter by which the pleats 20 are severed may be abnormally flexed to conform to this convexity so that by presenting a shoe toe foremost to the cutter and advancing it lengthwise just once the trimming cut executed by the cutter will begin at the toe end of the shoe and will progress along both sides of the shoes simultaneously, thereby severing the projecting pleats without severing the unpleated portions of the flange 18.

The illustrated machine comprises a base 22 provided with an inclined platform 24 on which a frame is affixed, the frame consisting essentially of a bottom section 26 and a top section 28. The frame is secured to the platform 24 by screws 29, Fig. 3. A power-driven shaft 30 is journaled in a sleeve 32 affixed to the upper frame section 28. A pulley 34 is affixed to the upper end of the shaft 30 to be driven by a belt (not shown) that may receive power from any convenient source. Two posts 36 are affixed to and project upwardly from the bottom section 26 to support a segmental cutter guard 38 in lapped relation to the cutter 42. This guard nearly surrounds the shaft 30 but is cut away at the front (Figs. 2 and 5) to provide a gap wide enough to receive the toe of a lasted shoe.

The shaft 30 carries a flat, rigid disk 40 (Fig. 4) which constitutes a driver for an annular disk cutter 42 having a circular cutting edge 44 at its perimeter. The cutter 42 is made of thin, flexible steel and is normally flat but readily capable of being flexed. The driver 40 is provided with a plurality (three being the number shown) of pins 46 by which the cutter is centered and driven. Holes 48 formed in the cutter near its inner edge receive the driving pins 46, and are preferably slightly larger than the pins so that the cutter may creep up and down relatively to the pins. This articulated driving connection provides for axial flexing or wavering of the cutter relatively to its driving means. The outer ends of the pins 46, as shown, are provided with small heads adapted to pass through the holes 48. Leaf springs 50 made of spring wire are anchored to the disk 40 by screws and washers 52, the outer ends of the springs being arranged to lie against the pins 46 and to bear upon the inner margin of the cutter with a light downward pressure. The springs may be readily flexed away from the pins to release their outer ends from the heads of the pins, and may pass over the pins to provide for attaching and detaching the cutter.

The cutter guard 38 is arranged under and close to the cutter, and its outer margin projects far enough beyond the cutting edge 44 to safeguard the operator against injury.

The gap formed in the front portion of the guard 38 (see Figs. 2, 3 and 5) is wide enough to receive the toe portion of a lasted shoe of maximum width, a segment of the cutting edge 44 being thereby exposed or rendered accessible for operation on a shoe. That segment of the cutter that extends across this gap in the guard 38 at any given time is hereinafter termed a work-engaging portion of the cutter.

The illustrated machine is provided with means for producing and maintaining deflection or abnormal curvature of this work-engaging portion of the cutter so that the cutting edge thereof may conform to curved surfaces such as the bottoms of lasted shoes. (Figs. 6 and 7 illustrate a typical transverse curvature in a shoe bottom.) For this purpose two abutments, shown as anti-friction rolls 54, are arranged to engage the upper surface of the cutter in tandem relation and adjacent respectively to the two extremes of the work-engaging portion, while a third abutment, shown as an anti-friction roll 56, is arranged to engage the under surface of the cutter midway between the points engaged by the two tandem abutments 54. The roll 56 is inclined relatively to the cutter and is preferably a thin circular disk to enable the toe of a shoe to pass under its margin, but is rendered stiff or rigid by its dished formation. The disk 56 (Fig. 4) is affixed to a freely rotatable stem 58 journaled in a sleeve 60 extending through, and having a screw connection with, a split bracket 62. The rolls 54 engage the cutter at radii having a considerable angular relation to each other but are adjustable toward and from each other for the purpose of regulating the abnormal curvature of the cutter. As shown, these rolls are journaled in brackets 64 and the brackets are clamped against the lower surface of a flange 66 formed on the bearing sleeve 32, each bracket 64 being secured individually by a clamping bolt 68 that extends through the upper frame section 28 and through the flange 66. The brackets 64 are bored and tapped to receive the clamping bolts, and the frame section 28 and the flange 66 are provided with segmental slots 70 through which the bolts extend. A concentric groove 72 formed in the under surface of the flange 66 receives ribs formed on the brackets 64 to maintain the brackets so that the axes of the rolls 54 will always be radial relatively to the axis of the cutter.

The screw-sleeve 60 is adjustable axially to regulate the magnitude of abnormal flexure imparted to the cutter 42, the screw connection between the sleeve and the bracket 62 providing for such adjustment, while a pinching screw 74 serves to maintain the adjustment by compressing the sides of the bracket to clamp the sleeve. The bracket is adjustably secured to a fixture 76 by a clamping bolt 78 that extends through a curved slot 80 in the fixture and is screwed into the bracket. A curved groove 82 formed in the fixture 76 receives a rib formed on the bracket 62, the curvature of this rib and groove connection being concentric with regard to the point of contact between the abutment 56 and the cutter 42. This adjustment provides for inclining the abutment 56 to clear the toes of the shoes, since in practice the toes pass under the cutter and also under the forward portion of the member 56 as shown in Fig. 4. The fixture 76 is clamped to the lower frame section 26 by a bolt 84, and a slot 85 in the fixture provides for adjusting the abutment 56 toward the axis of the cutter as the diameter of the cutter is reduced by repeated sharpening.

The illustrated machine is also provided with gaging means arranged to engage the upturned bottom of a shoe so that when the shoe is advanced toward the cutters the bottom surface of the shoe will clear the cutting edge and pass under the cutter while the pleats or wrinkles on the bottom will encounter the cutting edge and be trimmed flush or nearly flush. The gaging means comprises an idle roll 86 and a pair of idle rolls 88 forming, in effect, a tripod, the rolls 88 being arranged to run on the bottom of the shoe near the edges thereof while the roll 86 is arranged to run on the shoe along or near the longitudinal median line thereof. The two rolls 88 maintain the shoe against rocking from side to side, while the roll 86 in addition to cooperating with the rolls 88 to guide the shoe as hereinabove explained, also serves to direct the toe end of the shoe so that it will pass under the cutter 42. The roll 86 is arranged so that its point of contact with the shoe is very close to the cutting edge of the work-engaging portion of the cutter.

The roll 86 is journaled in a fork formed at the lower end of a stem 90, the stem extending through a bearing sleeve 92 provided with an external screw thread. This sleeve is screwed into a socket formed in a block 94 secured to the upper frame section 28 by a clamping bolt 96. The bolt extends through a slot 98 formed in the block to provide for adjusting the roll 86 toward and from the axis of the cutter, while the screw sleeve 92 provides for adjusting the roll lengthwise of the cutter's axis so that its work-engaging point may be placed at the desired level to insure trimming the lumps 20 flush or nearly flush with the general plane of the margin 18 of the upper. The forward end of the block 94 is divided by a kerf 100 (Fig. 2) that intersects the screw-threaded socket, and the divided portions of the block are connected by a pinching screw 102 whereby they may be tightened to clamp the sleeve 92. To limit turning movement of the stem 90, two pins 104 are inserted into the block 94 and a pin 106 is inserted into the

stem, the outer end of the pin 106 projecting between the pins 104.

As shown in Fig. 5, the roll 86 is thin to enable it to run between adjacent pleats 20, and the fork of the stem 90 is wide to permit the roll to creep axially to the right or left of a pleat rather than to run on it. Light springs 87 maintain the roll normally at a central position but yield so easily that the roll may be deflected by a pleat. Moreover, the limited loose play of the pin 106 between the pins 104 (see Fig. 3) permits a slight turning of the stem 90 in response to the demands of pleats that run against the sides of the roll 86 with a skewing effort.

The two work-engaging rolls 88 are both affixed to an axle 108 the ends of which are journaled in an adjustable hanger 110. The upper end of this hanger is connected by trunnions 112 to the frame section 28. An adjusting screw 114 extends loosely through the hanger 110 and is screwed into a fixture 116 secured to the frame section 28. A compression spring 118 (Fig. 1) interposed between the fixture 116 and the hanger 110 tends to raise the rolls 88, while the screw 114 maintains the rolls positively at the desired level.

The illustrated machine is also provided with a work support 120 adapted to maintain the upturned bottom of the shoe in contact with the tripodal means comprising the three rolls 86, 88. As shown, this work support is in the form of a concaved spool or roll (Fig. 5), its concavity being effective to maintain the longitudinal median line of the shoe approximately in register with the median radius of the work-engaging portion of the cutter. The supporting roll 120 is arranged between the free ends of a U-shaped holder 122 and is connected thereto by a rod 124 that provides for free rotation of the roll. The holder 122 is connected to the frame section 28 by trunnions 126 that permit the roll to move up and down. The roll 120 is normally supported in an initial position by springs that permit it to be depressed by a wedging action of the toe end of a shoe as the latter is advanced toward the cutter. As shown, rods 128 are connected respectively to the arms of the holder 122 by pivot members 130 and extend downwardly through holes formed in the bottom section 28 of the frame. Compression springs 132 surround the rods and are maintained under initial compression by nuts 134 screwed on to the lower ends of the rods and arranged to bear against the bottom of the platform 24. These nuts are effective to establish the initial position of the roll 120.

The operation of the machine is as follows: assuming that the cutter 42 is being driven (the direction of rotation being optional) and that the abutments 54 and 56 have been adjusted to develop the desired deflection of the work-engaging portion of the cutter, the operator holds a shoe bottom up and presents it manually toe foremost by inserting it between the supporting roll 120 and the guide rolls 88. If the heel end of the shoe is held at too low a level when the toe end is inserted between the rolls 120 and 88 the toe end will strike the guide roll 86 and will be thereby deflected downwardly or will be arrested before it reaches the cutting edge. Further advancement of the shoe will thus be delayed until the heel end is lifted to a level that will place the bottom surface of the shoe in tangent relation to the roll 86 as shown in Fig. 1, since to advance the shoe to this position the operator must apply sufficient effort to force the supporting roll 120 downwardly against the applied force of the springs 132. When the shoe has been placed in the position shown in Fig. 1 the upper surface of the overdrawn marginal portion 18 is substantially flush with, or slightly below, the bottom surface of the cutter, and the shoe may now be advanced further without danger of severing any portion of the shoe other than the upstanding pleats 20. As the shoe is advanced the toe end is directed by the roll 86 so that it will pass under the cutter and under the margin of the disk 56 as shown in Figs. 2 and 4, the supporting roll 120 continuing to maintain the upturned bottom of the shoe in contact with the rolls 86 and 88 so that the shoe will advance in a curvilinear path determined by the longitudinal curvature of the shoe bottom.

The cutting edge 44 travels lengthwise and therefore executes a draw cut which is most effective to sever woven fabric. The severing begins at the toe end of the shoe and progresses simultaneously along the right and left sides thereof, the abnormal curvature of the cutter due to its deflection by the abutments 54 and 56 insuring flush or nearly flush trimming of the pleats 20 not only at the extreme toe end but also along the sides of the shoe as far back as pleats exist. Thus, the operator has merely to advance the shoe lengthwise until all the pleats have been severed, and then retract the shoe, one advancement being sufficient to cause all the trimming required by one shoe.

Figs. 1, 3 and 5 illustrate a grinding device for sharpening the cutting edge 44 without demounting the cutter or interrupting its rotation. This device comprises a freely rotatable abrading roll 136 having a stem journaled in a stationary bracket 138. The abrading roll 136 overlies the cutting edge 44 and is placed at an angle that will present one of its end faces to the margin of the cutter 42. An idle supporting roll 140 is arranged under the margin of the cutter 42 adjacent to the abrading roll 136 to deflect a segment of the margin far enough above its normal path of travel to enable the abrading roll to function without touching the guard 38. A sleeve 142 screwed into the

bracket 138 furnishes a bearing for a stem 144 to which the abrading member 136 is affixed. The screw sleeve 142 is provided with a nurled head 146 by which it may be rotated by the operator's fingers to adjust the abrading member 136 up and down. In practise, the abrading member 136 will be adjusted to clear the cutter 42 when the machine is being used, but when it is desired to sharpen the cutter the operator has merely to turn the head 146 in a direction that will cause the abrading member to contact with the cutter. The rotation of the cutter 42 while in contact with the abrading member 136 imparts rotation to the latter so that the wear of the abrading member is evenly distributed. One or two seconds of abrasion are usually sufficient to sharpen the cutting edge, after which the operator may turn the head 146 in the reverse direction to retract the abrading member.

Although the invention has been described with reference to flexing the cutter and regulating its flexure according to the transverse curvatures of shoe bottoms, the screw sleeve 60 (Fig. 4) provides for adjusting the abutment 56 to relieve all flexure of the cutter. Consequently the machine may be used to cut or trim in a perfectly flat plane if desired, without changing cutters.

Since the cutter herein shown is normally a flat annulus of steel so thin as to be readily flexible it may be manufactured at a cost considerably less than a non-flexible cutter that requires molding or pressing to give it a permanent dished formation. Thus, in addition to providing for regulating the curvature characteristic of the cutter, the invention also effects a saving in cutter expense.

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

1. A machine of the character described comprising a flexible power-driven cutter the cutting edge of which extends lengthwise of its path of travel, and anti-friction rolls arranged to bear against opposite faces of said cutter at points relatively to which the cutter moves and thereby to impart an abnormal curvature to the cutting edge of a work-engaging portion of the cutter.

2. A machine of the character described comprising a normally flat and flexible power-driven cutter the cutting edge of which extends lengthwise of its path of travel, and relatively adjustable anti-friction rolls arranged to bear against opposite faces of said cutter at points relatively to which the cutter moves and thereby to impart an abnormal curvature of regulatable degree to the cutting edge of a work-engaging portion of said cutter.

3. A machine of the character described comprising a normally flat and flexible rotary disk cutter, means for rotating said cutter, and cooperative abutments arranged to bear against opposite faces of said cutter to impart flexure to the cutting edge of a work-engaging portion of the cutter, said cutter being rotatable relatively to said abutments.

4. A machine of the character described comprising a normally flat and flexible rotary disk cutter, means for rotating said cutter, and cooperative abutments arranged to bear against opposite faces of said cutter to impart a sinuous curvature to the cutting edge of the cutter, said cutter being rotatable relatively to said abutments and said abutments being relatively adjustable to regulate such curvature.

5. A machine of the character described comprising a normally flat and flexible cutter having a cutting edge movable lengthwise to trim surplus material from the bottom of a lasted shoe, means for driving said cutter, means arranged to guide a shoe endwise to said cutter, and means arranged to bear against opposite faces of said cutter to curve a work-engaging portion of the latter in conformity with a curvature of the bottom of the shoe.

6. A machine of the character described comprising a flexible cutter having a cutting edge arranged to trim surplus material from the bottom of a lasted shoe, means for operating said cutter, means arranged to guide a shoe to said cutter, and a series of abutments arranged to bear against opposite faces of said cutter to flex a work-engaging portion of the latter, said abutments being relatively adjustable to regulate the degree of such flexure in conformity with the transverse curvature of a portion of the shoe-bottom.

7. A machine of the character described comprising a flexible cutter having a cutting edge movable lengthwise to trim surplus material from the bottom of a lasted shoe, means for operating said cutter, means arranged to guide a shoe to said cutter, and a series of three rollers arranged to flex the cutting edge of a work-engaging portion of said cutter in conformity with a curvature of the shoe-bottom.

8. A cutting machine comprising a normally flat disk cutter of thin flexible steel, two abutments in tandem relation arranged to engage one face of said cutter, and an abutment arranged to engage the opposite face of said cutter between said tandem abutments, said abutments being so related as to flex said cutter and said cutter being rotatable relatively to them, and means for driving said cutter.

9. A machine of the character described comprising a normally flat and flexible cutter arranged to trim surplus material from the bottom of a shoe, means for operating said cutter, and a series of abutments arranged to flex a work-engaging portion of said cutter in conformity with a curvature of the shoe-

bottom, said cutter being movable relatively to said abutments.

10. A cutting machine comprising a rotary disk cutter, a segmental guard arranged in confronting relation to a face of said cutter and the margin thereof projecting beyond the cutting edge of the cutter, the ends of said guard being spaced apart to provide a gap wide enough to receive the toe portion of a lasted shoe presented to that segment of the cutter that extends across said gap, and means for driving said cutter.

11. A cutting machine comprising a rotary disk cutter, a segmental guard arranged in confronting relation to a face of said cutter and the margin thereof projecting beyond the cutting edge of the cutter, the ends of said guard being spaced apart to provide a gap wide enough to receive the toe portion of a lasted shoe presented to that segment of the cutter that exends across said gap, means for driving said cutter, and means arranged to flex said segment of the cutter so that it will describe an abnormal path of travel across said gap.

12. A machine of the character described comprising a normally flat and flexible annular cutter, guiding means arranged to bear against opposite faces of said cutter to produce and maintain lateral deflection of a segment thereof, and rotary driving means by which said cutter is driven relatively to said guiding means, said driving means and said cutter forming an articulated driving connection to provide for such lateral deflection of the cutter.

13. A machine of the character described comprising a rotary driver and a normally flat and flexible annular cutter forming an articulated driving connection to maintain them in concentric relation but to permit axial wavering of the cutter, and a series of abutments, relatively to which said driver rotates, arranged to bear against opposite faces of said cutter to produce and maintain a sinuous formation in a segment of the latter.

14. A machine of the character described comprising a rotary driver having a plurality of driving pins, a normally flat and flexible annular cutter having holes through which said pins extend loosely to provide an articulated driving and centering connection adapted to permit flexure of said cutter, and means, relatively to which said driver and cutter may rotate, arranged to bear against opposite faces of said cutter to produce and maintain a sinuous formation in a segment of the latter.

15. A machine of the character described comprising a normally flat and flexible annular cutter arranged to trim surplus material from the bottom of a lasted shoe, means arranged to flex a segment of said cutter to conform to the transverse curvature of the shoe-bottom, and means arranged to drive said cutter relatively to said flexing means and to provide for progression of such flexure around the cutter.

16. A machine of the character described comprising a normally flat and flexible annular cutter arranged to trim surplus material from the bottom of a lasted shoe, two rollers arranged to bear against one face of said cutter at radii having a considerable angular relation to each other, an intermediate roller arranged to bear against the opposite face of said cutter midway between said radii to flex a work-engaging segment of the cutter in conformity with the transverse curvature of the shoe-bottom, and rotary driving means having an articulated driving connection with said cutter to provide for progression of such flexure around the cutter.

17. A cutting machine comprising a rotary driver, a normally flat and flexible cutter operatively connected to said driver, said cutter having a circular cutting edge extending lengthwise of its path of travel, and means arranged to engage said cutter to cause said cutting edge to describe a sinuous path of travel.

18. A trimming machine comprising a power-driven cutter formed and arranged to sever surplus material on the bottom of a lasted shoe, means arranged to run on the bottom of the shoe to guide the latter along a predetermined path to said cutter, and yieldable means arranged to maintain the shoe against said guiding means.

19. A trimming machine comprising a power-driven cutter formed and arranged to sever surplus material on the bottom of a lasted shoe, tripodal means arranged to run on the bottom of the shoe to guide the latter to said cutter and to maintain the shoe against rocking, and a yieldable roll arranged to run on the forepart of the shoe to maintain three-point contact of the shoe bottom with said tripodal means.

20. A cutting machine comprising a thin flexible cutter having a cutting edge movable lengthwise, a guard arranged adjacent to one face of said cutter and in lapped relation to said cutting edge, an abrading device arranged to operate on the other face of said cutter to sharpen said edge, and means arranged to deflect a portion of said cutter away from said guard and toward said abrading device.

21. A cutting machine comprising a thin flexible cutter having a cutting edge movable lengthwise, means for driving said cutter, an abrading device arranged to operate on one face of said cutter to sharpen said edge, and means arranged to deflect a portion of said cutter from its normal path of travel into engagement with said abrading device.

In testimony whereof I have signed my name to this specification.

SIDNEY J. FINN.