

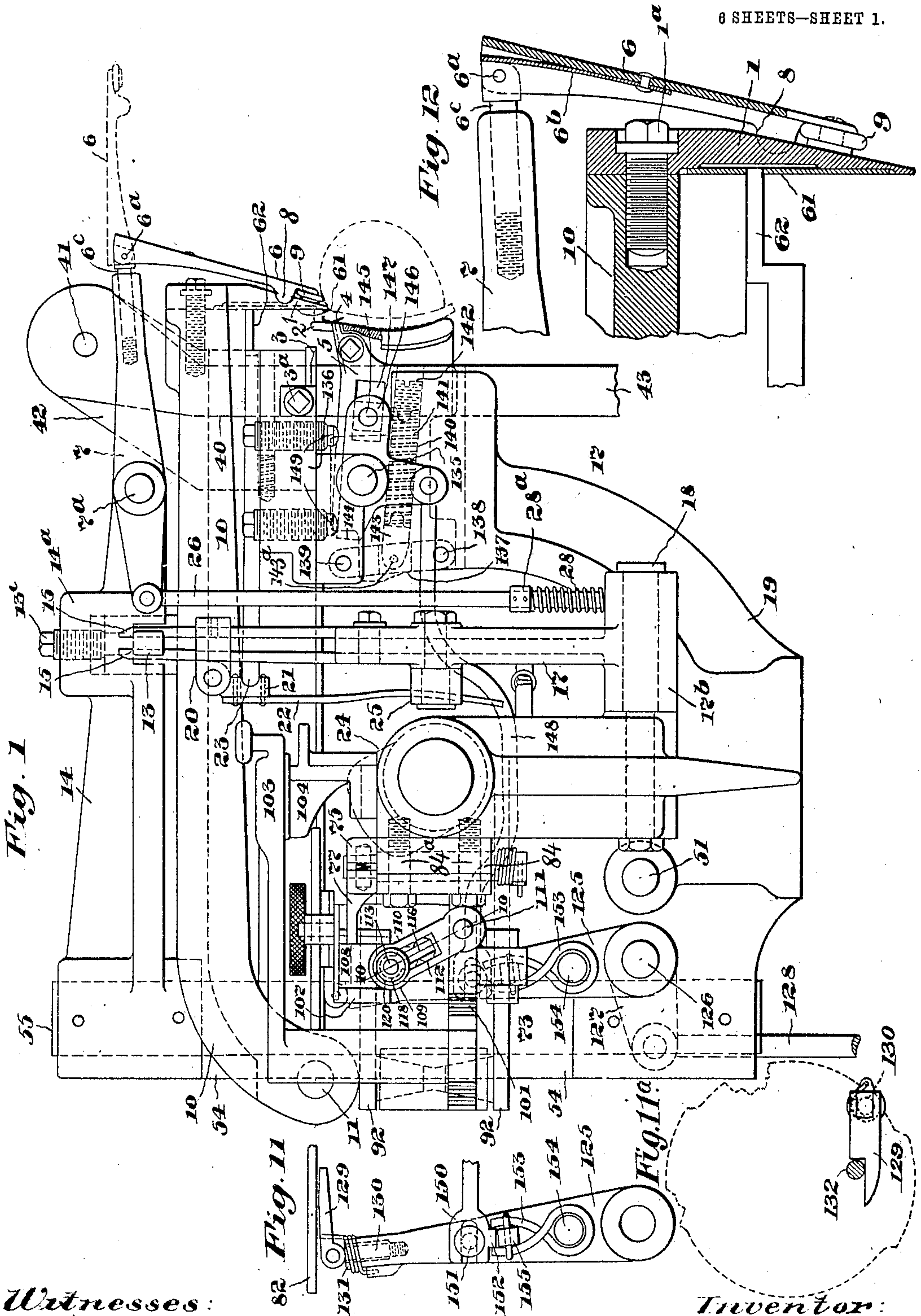
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PATENTED NOV. 26, 1907.

A. M. ENGLISH.
SOLE ROUNDING AND CHANNELING MACHINE.

APPLICATION FILED APR. 10, 1905.

6 SHEETS—SHEET 1.



Witnesses:
Horace D. Crossman.
Ernest S. Emery

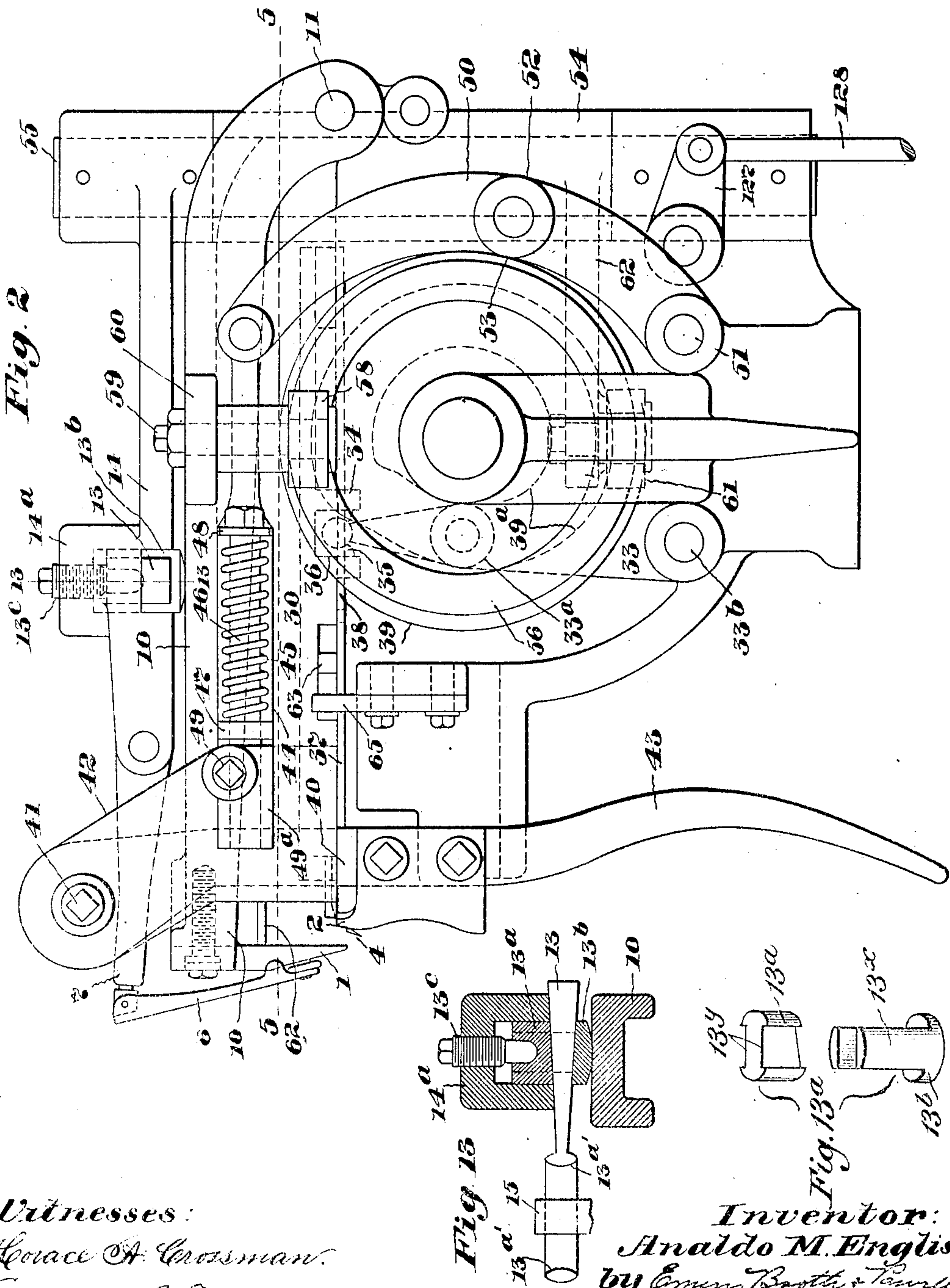
Inventor:
Arnaldo M. English
by Emory Booth & Tamml
Attys

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6 SHEETS—SHEET 2.



Witnesses:
Horace A. Crossman.
Emmet L. Emery.

Inventor:
Analdo M. English
by Emory Booth & Powell
Attys

No. 871,987.

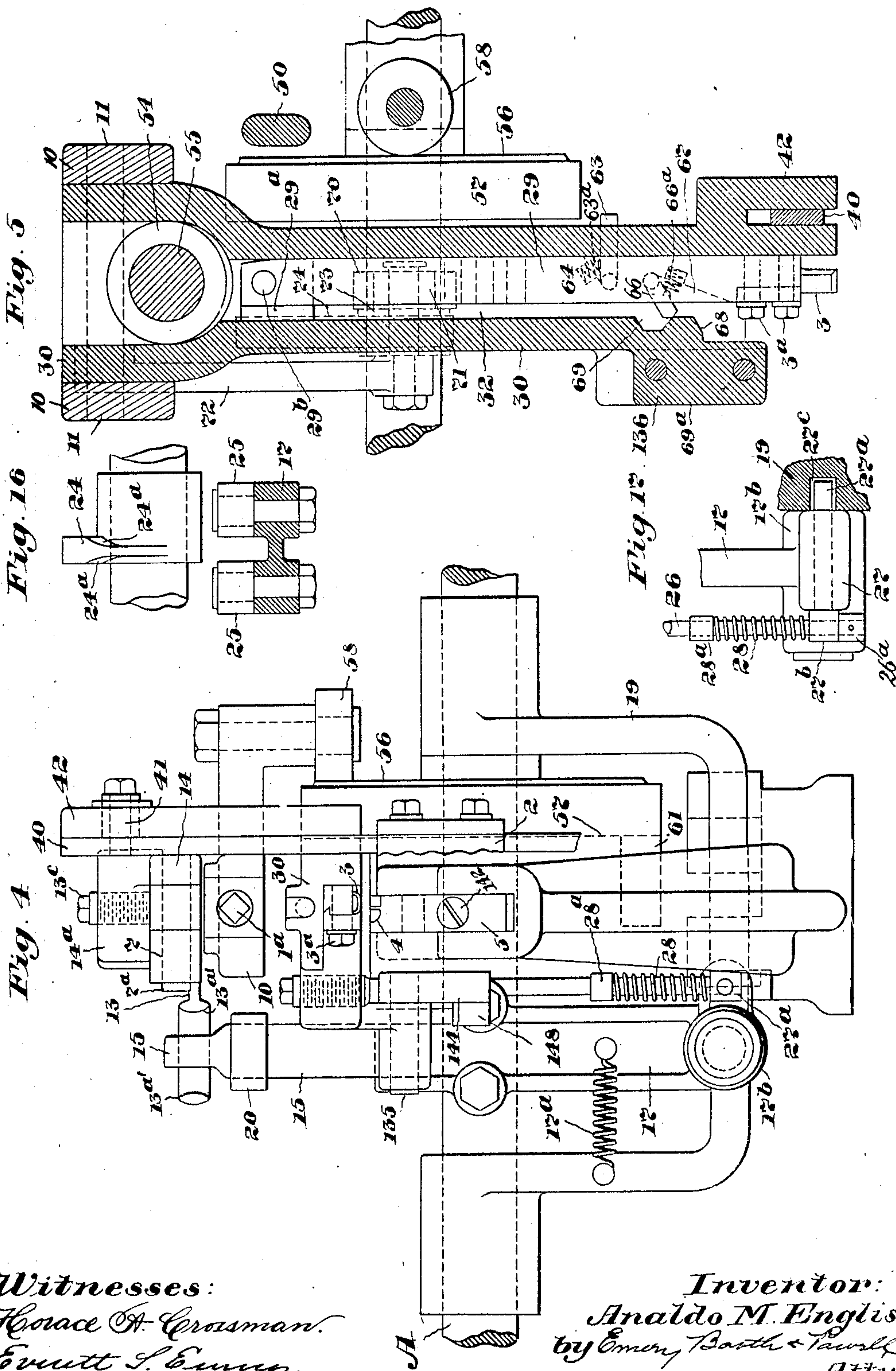
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6 SHEETS—SHEET 4.



Witnesses:
 Horace A. Crossman.
 Everett S. Emery.

Inventor:
 Analdo M. English
 by Emory Barth & Tawell
 Attys.

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6 SHEETS—SHEET 6.

Fig. 18

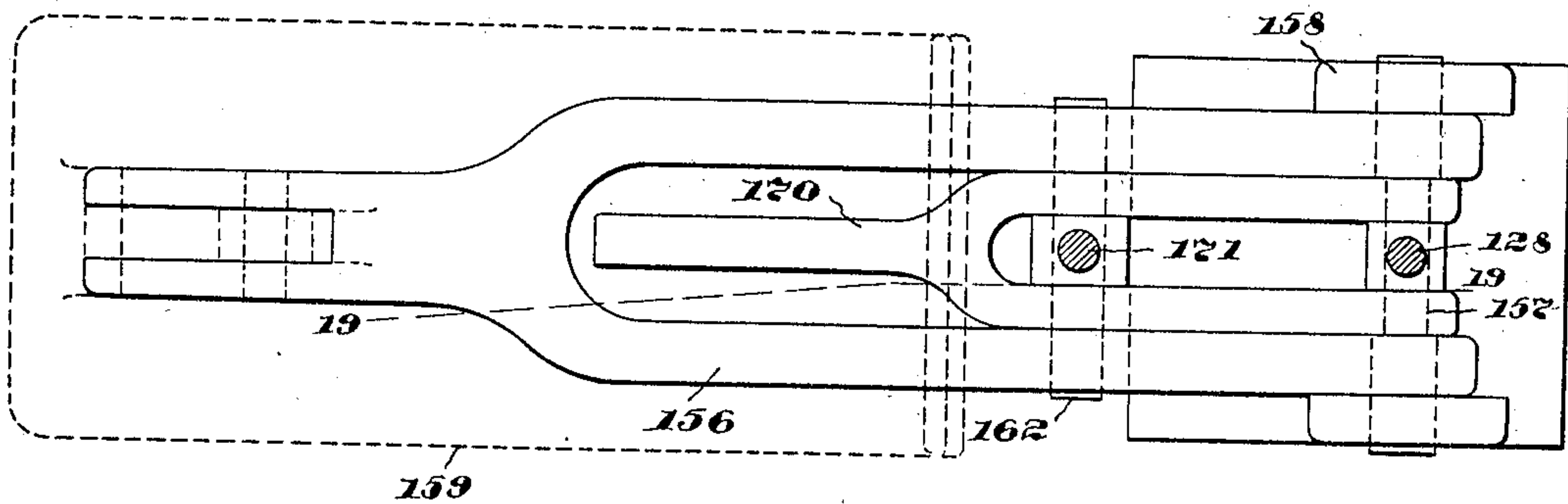
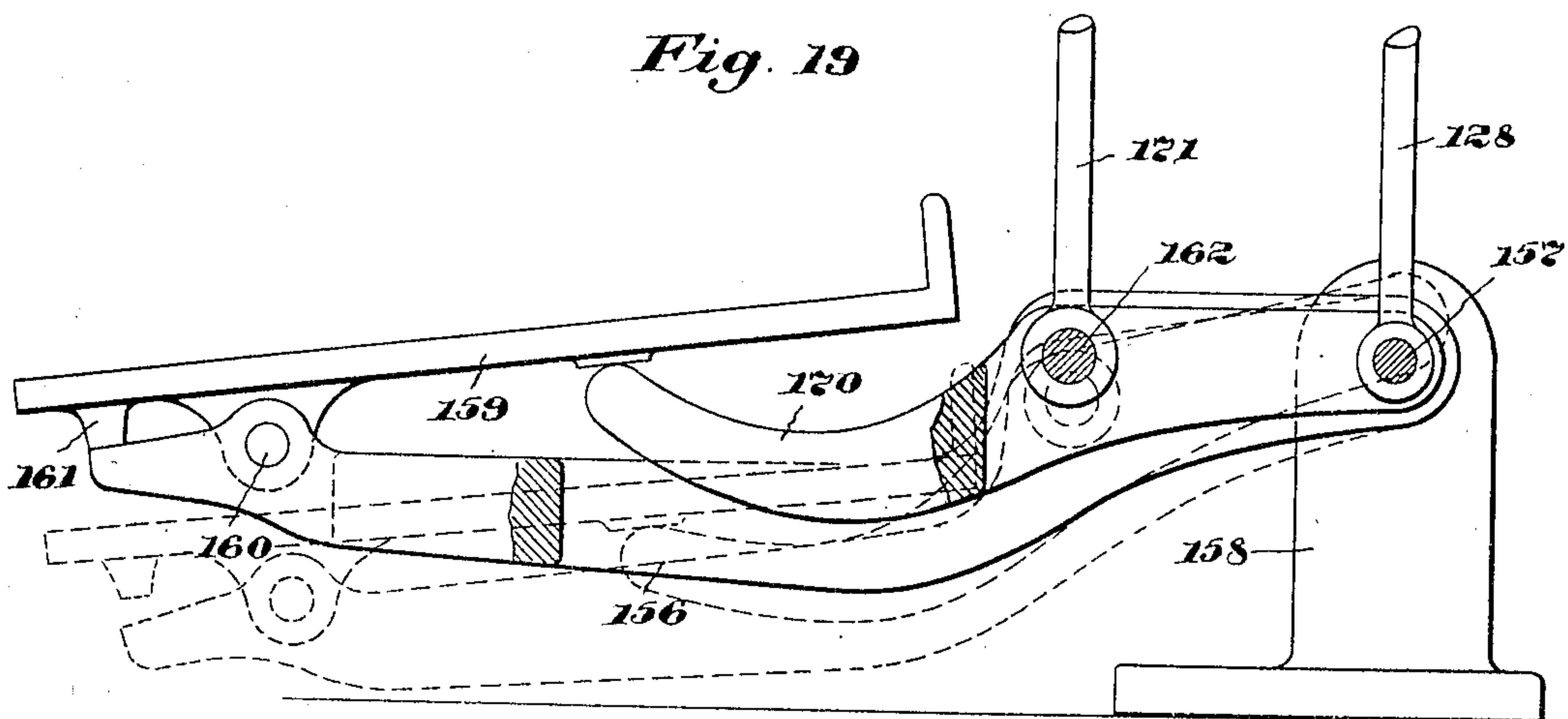


Fig. 19



Witnesses:

Herace A. Crossman.
Ernest L. Curry.

Inventor:

Analdo M. English
by Emory Barth & Paul
Attys.

UNITED STATES PATENT OFFICE.

ANALDO M. ENGLISH, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO MANUFACTURERS MACHINE COMPANY, OF MONTCLAIR, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SOLE ROUNDING AND CHANNELING MACHINE.

No. 871,987.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed April 10, 1905. Serial No. 254,708.

To all whom it may concern:

Be it known that I, ANALDO M. ENGLISH, a citizen of the United States, residing at Boston, in the county of Suffolk, Commonwealth of Massachusetts, have invented an Improvement in Sole Rounding and Channeling Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to machines for operating upon the soles of boots and shoes and particularly to such as are intended to trim and to channel the sole of a shoe while on the last, and known in the trade as "rough rounders".

In trimming the soles of boots and shoes it is often desirable to form thereon what is known as a "Scotch" edge, that is to say, a widened extension of the sole around the ball of the shoe. Sometimes, when this extension is of greater width at the outside of the ball, than at the inner side thereof, it is known as a "Baltimore" edge.

Machines for this purpose have long been known in the art and are of several different types, but so far as known to me all comprise in general a work guide, and a chopping or trimming knife, movable one relatively to the other, to vary the width of the sole extension during the trimming operation. In the older types of these machines the work guide operated usually in the bottom of the crease and against the inseam of the shoe throughout its entire travel around the shoe. A machine of this type is illustrated in U. S. patent to Turner No. 232,382, dated September 21, 1880, and in said Turner patent, the guide and the trimming or chopping knife, and the channeling knife are all made relatively adjustable for varying the width of extension left by the trimming knife and also for varying the position of the channel from the edge of the sole. In the machine illustrated in this patent also, the channel knife may be left freely adjustable by and with the trimming or chopping knife, whereby the distance of the channel from the sole edge might remain constant, notwithstanding the varying positions of the sole edge from the inseam.

It is desirable to guide from the inseam, along the sides of the shank of the shoe because the trimming, in the shank, should be

as close as possible to the inseam, and it is desirable for a number of reasons, to guide also from the inseam about the fore part of the shoe as well. While theoretically, the inseam usually follows the contour of the last, at the bottom thereof, and should therefore furnish an accurate guiding line, according to which the sole might be trimmed, it is a fact, nevertheless, that the inseam frequently varies more or less owing for example to inaccurate channeling or sewing or to variations in thickness or texture of the upper leather along the line of the inseam. In later machines devised for this same work, such for instance, as illustrated in patent to White, No. 249,279, dated November 8, 1881, the guide was shown so constructed as to act not in and along the inseam, but along the last close to the inseam, so that the trimmed edge produced by the use of this guide would show the irregularities if any existing in the inseam, but would, nevertheless, follow a line closely paralleling what the inseam ought to be and what perhaps in the majority of cases such inseam would be. Such a last guide, however, was objectionable, not only for the reason above stated, namely, that in the shank it was desirable to trim more closely to the inseam than a last guide would conveniently permit, but also because the heavy pressure with which these shoes must be held against the guide during a rough rounding and channeling operation, might tend to bruise, mar, or, in the presence of dirt, soil the upper, along which the last guide must slide in passing around the shoe. These objections led to the use of an inseam guide along the shank only of the shoe where the sole edge is more or less concealed by the overhanging body of the shoe, and consequently, where the necessity of symmetrical outline is not so great; and, when the fore part is reached, transferring the guide from the inseam to the edge of the last, or the upper thereon. This required two independent guides, one working along the shank portion of the shoe, and the other around the fore part. Such a machine is illustrated in the patent to French & Meyer, No. 599,602, Feb. 22, 1898, in which the locations of the cuts, both of the trimming and channeling knives along the shank portion are determined by keeping the inseam of the shoe pressed up against a stationary guide, and

when the fore part is reached, a separate and independent guide is moved forward, and by engaging the last, above the inseam, pushes the shoe away from the inseam guide, and thereafter assumes control thereof, guiding wholly from the last, so that any irregularities that may exist in the inseam, are not communicated to the sole outline. Guiding the shoe, from the last, however, is not free from objections for the reason that the pressing of the shoe against the guide with the firm pressure required in these machines, frequently mars the leather; and in the manufacture of russet or tan shoes, there is the added liability of soiling the leather from particles of dirt or grease falling between the guide and the upper, and rendering the shoe unfit for the market, unless, perhaps, it may have been cleaned at considerable expense.

My invention aims to use a single guide throughout the contour of the shoe thereby to avoid shifting from one to another of two independent guides.

My invention also aims to employ the guide along and from the inseam only, with all the advantages possessed by such a guide, but, at the same time, furnish means, preferably of feeler or other light and non-guiding nature that will not mar or soil the upper, whereby this inseam guide may be so adjusted from time to time as to compensate for and offset any irregularities in position of the inseam, in order that the inseam may be relied upon as a sufficiently accurate guide for producing a trimmed sole of symmetrical outline corresponding to that of the last, even though not produced thereby.

A further aim is to combine with such an inseam guide means for producing the "Scotch" or "Baltimore" extension edges where desired.

The nature of my invention and other objects and advantages thereof will be clearly apparent from a description of one embodiment, which has been selected for illustration herein, and is shown in the accompanying drawings, and its scope will be pointed out in the appended claims.

In the drawings,—Figure 1 is a lefthand side elevation of the head of a machine, embodying my invention; Fig. 2 is a right hand elevation thereof; Fig. 3 is a plan view looking down upon the top of a machine; Fig. 4 is a front elevation; Fig. 5 is a horizontal sectional view through the knife carrier and adjacent parts on the line 5—5, Fig. 2; Fig. 6 is a horizontal sectional view below the pattern on the line 6—6, Fig. 7; Fig. 7 is a side elevation of the parts shown in Fig. 6; Fig. 8 is a horizontal section on the line 8—8, Fig. 7; Fig. 9 is a vertical section on the line 9—9, Fig. 6 looking to the right; Fig. 10 is a section on the line 10—10, Fig. 1; Fig. 11 is a detailed view of the pattern and channel knife operating lever; Fig. 11^a is a detached

detail of the starting dog and pattern pins. Fig. 12 is a vertical longitudinal section of the inseam guide and feeler; Fig. 13 is a section on the line 13—13, Fig. 2; Fig. 13^a is a detail view of the wedge guide blocks. Fig. 14 is a plan view of the knife carrier adjusting wedge and operating parts connected therewith; Fig. 15 is a side elevation of the parts shown in Fig. 14 showing a part of the knife carrier adjacent thereto; Fig. 16 is a plan view partly in section of the guide wedge adjusting member and its operating cam; Fig. 17 is a detail view partly in section of the hub of the member for adjusting the guide wedge; Fig. 18 is a plan view partly in outline of treadle mechanism for the machine; Fig. 19 is a side elevation partly in section on the line 19—19 Fig. 18.

In the machine which has been herein selected for the illustration of my invention and is shown in the accompanying drawings, the edge of the sole is inserted between an inseam guide 1 and a spring-actuated presser or clamp 2, as indicated by dotted lines, Fig. 1 with the welt resting against the inner face of the guide and the extremity of the guide bearing firmly at the bottom of the crease against the inseam. The sole thus held stands in the path of a trimming or chopping knife 3, and against a channeling knife 4, the latter formed upon the forward extremity of a laterally stationary but vertically adjustable block 5 and engaging the tread surface of the sole at the proper distance from the edge thereof to form the channel, as the sole is fed past it.

In trimming the sole around the fore part of a shoe it is desirable that the outline thereof shall be symmetrical with respect to the general outline of the shoe as viewed from above. The inseam, however, which here forms the guiding basis, is found to run somewhat irregularly with respect to such outline and it is necessary therefore to provide means whereby the inseam guide may be automatically adjusted to provide for errors in the position of the inseam at any point, arising from this source. To this end I have provided, adjacent the inseam guide 1, a guide adjusting member comprising a feeler 6 pivotally mounted upon a rocking lever 7 and held by a spring 6^b in contact with the outer face of the guide 1; lugs 8 being formed upon either side of the feeler 6 to embrace the guide 1 and maintain the feeler in alinement therewith. The operative extremity of the feeler is provided with a testing roll 9 which is adapted to rest against the upper of the shoe operated upon just above the inseam and follow the contour of the last within the shoe, whereby through suitable mechanism, hereinafter described, the guide 1 is adjusted with respect to the trimming knife and is caused to so guide the shoe from the inseam that

the sole will be trimmed along a line symmetrical with the general outline of the shoe. The feeler 6 is here shown in the position relatively to the guide 1 which it will assume when the guide is operative along the shank of the shoe; when in normal inoperative position the feeler rests substantially adjacent the end of the guide. At the same time during such trimming operation of the sole the channeling knife 4 forms a channel within the tread surface thereof at a distance from the edge determined by the relative positions of the trimming knife 3 and such channeling knife. When it is desired to form a wider extension, *i. e.*, a "Scotch" or a "Baltimore" edge, on the sole outside of the ball portion of the shoe, the trimming knife 3 is raised or moved transversely of its trimming stroke, whereby it is caused to trim the sole at a greater distance from the extremity of the guide member 1. The movements of the trimming knife for this purpose are controlled by suitable mechanism hereinafter described, whereby the outline of the extension sole may be determined automatically.

The feed of the work is effected by the combined clamping and feeding action of the in-seam guide 1, the cooperating four-motion presser 2 and the trimming knife 3, made laterally movable for the purpose. These three members grip the work and carry it the length of a feeding stroke, whereupon the presser 2 is relieved of clamping pressure and, together with the in-seam guide 1, returns to its initial position, where both again seize the work and hold it for another trimming stroke of the trimming knife. At the end of each feed and in order to prevent retrograde movement of the work by the return of the guide and presser, the trimming knife 3 is locked, so as to hold the work until the guide and presser have completed their return movements, whereupon it is withdrawn from the work, is unlocked, and returned alone to its initial position, preparatory to another trimming stroke. The laterally stationary channeling knife buried in the work, aids the trimming knife in retaining the work against retrograde movement during the return stroke of the guide and presser. The channeling knife, furthermore, has a movement toward and from the trimming knife, whereby the distance of the channel from the edge of the sole may be varied where necessary. For example, it is usual to locate the channel further within the edge of the sole along the shank portion, than around the fore part; for this purpose my invention contemplates means whereby the channel knife is moved by the operator to take a position at a proper distance from the trimming knife along the fore part of the sole, and to return to its other position around the shank of the sole.

In order to provide for vertical adjustment of the in-seam guide necessary to offset irregularities in the in-seam, said guide is mounted upon a supporting arm 10 pivoted at its rear end, at 11, to the sleeve 54, on the stationary stud 55. To detect these irregularities in the in-seam and to cause the necessary adjustment of the in-seam guide, the feeler 6 hereinbefore referred to, is pivoted at 6^a, to a stud 6^c, screwed into the end of and thereby made adjustable in a lever 7, pivoted at 7^a, upon the side of the horizontal fixed arm, 14, fixedly mounted at its rear end upon the upper end of said vertical stud 55. This feeler is held lightly in contact with the front face of the in-seam guide 1, by a jack knife spring 6^b (see Fig. 12); and carries at its lower end the roller 9, which travels along and upon the last, or the upper thereon, immediately above the in-seam.

The in-seam guide 1 is adjusted vertically, as indicated by the feeler 6, by means of a movable wedge, 13, the position of which is determined by said feeler. This wedge is interposed between the movable in-seam guide arm 10 and the fixed arm 14 that carries the feeler lever.

To guide the wedge properly between the arms 10 and 14, said wedge (see Fig. 13) slides in a two-part guide block, consisting of the parts 13^a and 13^b, having respectively the arms 13^x and guideways 13^y mounted to slide one in the other to permit said parts to separate and come together to accommodate the adjustments of the wedge 13, said parts also being adjustable both together in a hollow boss 14^a on said arm 14. The normal elevation of the arm 10 and its in-seam guide, may be determined by an adjusting screw 13^c, that acts upon said arm through the medium of said two-part guide block. The position of this wedge is shifted by means of a pair of grippers 15, which embrace the shank of the wedge (see Fig. 4) and are mounted upon the vertical oscillating arm 17, pivoted at 18, Fig. 1 to the frame 19, of the machine. This arm 17 and its grippers are maintained normally in position to the left, (Fig. 4) by means of a spring 17^a. The hub 17^b of this oscillating arm 17 has a lug 27 (Fig. 17) projecting from one side thereof, said lug carrying a headed stud 27^a, through the headed end of which passes the lower end of the rod 26 depending from the rear portion of the feeler carrying lever 7. To the rod 26, below the headed end of the stud 27^a, is secured a stop 26^a, and between the headed end of the stud 27^a and a collar 28^a on said rod, is disposed a spring 28, the construction and arrangement being such that any movement of the said feeler will be communicated to and oscillate the arm 17 and its connected grippers 15, causing the latter to shift in one or the other direction. The forward gripper 15 (see Fig. 1) has secured thereto a strap

20, which straddles the opposite gripper and has pivoted therein a block 21, fulcrumed on a lug 23, on said other gripper, and having a depending actuating spring arm 22. This
 5 spring arm 22 hangs in front of a cam 24, fast on the main shaft A, which at every rotation swings said spring arm 22 in a direction to cause the grippers 15 to approach
 10 24 (see Figs. 1 and 16) is provided also with side cam faces 24^a, which by passing at every rotation between a pair of roller studs 25 on the oscillating arm 17, center said arm,
 15 *i. e.*, bring it invariably to a given position, and thereby cause it, by engagement of its grippers with the wedge 13 to move said wedge to shift in one or the other direction and correspondingly adjust the inseam guide according to the position indicated by the
 20 feeler that controls the grippers.

In the operation of the machine, so long as the inseam is at the proper distance inward from the edge of the last the feeler will travel idly along the upper covered last and effect
 25 no adjustment whatever of the wedge and the inseam guide. When, however, a rise or a dip in the inseam is met, the feeler will approach or recede from the active edge of the inseam guide and will thereby swing its grip-
 30 pers to cause the wedge to be engaged at a new point and when centered, by the cam 24, shift said wedge to the left or to the right, thereby to adjust the inseam guide either downward or upward by a distance neces-
 35 sary to offset the rise or dip in the inseam and leave the line of cut of the trimming knife as if no irregularity in the inseam had been encountered.

The rocking arm 17 is limited in its rocking
 40 movements and prevented from being moved out of range of the cam 24 by the end 27^b of the stud 27^a (Fig. 17) projecting into a socket 27^c in the frame 19 of the machine, which stud in the normal position of the arm is held
 45 centrally of said socket. The range of movement of the rocking arm 17 is sufficient to provide for all usual adjustments required for the inseam guide, but in practice it is found that extreme movement of the arm is seldom
 50 required.

To determine the range of movement of the wedge or distance member 13 the latter is provided with shoulders 13^{a'} Fig. 3 at either
 55 end of the flat shank of said member traversed by the gripping members 15. When the gripping members in their rocking movement strike against either of the shoulders 13^a, further movement of the arm 17 is stopped, although movement of the rod 26
 60 may be continued against the pressure of the relief spring 28; the friction between the wedge 13 and the arms 10 and 14 being sufficient to resist this spring pressure. When the wedge member has been moved to a posi-
 65 tion where one of its shoulders contacts with

the gripping members 15 when the latter are centered by the cam 24, no movement whatever of the wedge in the same direction is possible. Any extraordinary movement also
 70 of the feeler 6 beyond the range of movement of the wedge 13 will be taken up by the relief spring 28 without affecting the position of the inseam guide 1.

When the operator presses the inseam of a shoe up against the inseam guide, the shoe
 75 upper on the last at the same time contacts with and moves upwardly the feeler 6, thereby through the lever 7 and rod 26 rocking the gripper carrying arm 17 to the right against the spring 17^a. The cam 24 will then in its
 80 next rotation swing the spring arm 22 causing the grippers 15 to grip the wedge or distance member 13, further rotation of the cam serving to carry the wider portion thereof between the roller studs 25, and in case the
 85 studs are not alined with the path of said cam centering, the arm 17 and shifting the wedge 13 to the right or left according to the position in which said cam finds said arm 17, thus raising or lowering the guide arm 10 and
 90 its inseam guide 1, to position the shoe with respect to the trimming knife.

It is to be understood that when the roller studs of the gripper arm 17 are alined with the cam 24 so that the latter does not in its
 95 rotation shift the arm in one direction or the other, then and in that case the feeler 6 and the inseam guide 1 are in proper relative positions with respect to each other and with respect to the trimming knife to permit the
 100 guide to position the shoe for a given uniform width of sole edge.

The movements of the described parts of the feeler mechanism are so timed that the compensating movement of the inseam guide
 105 due to any irregularity in the inseam, will occur just prior to a trimming stroke of the knife.

By reason of the spring connection between the depending thrust rod 26 and the
 110 gripper arm 17, the feeler 6 is at all times freely vertically movable so that it may not bear unduly, press upon and mar the upper and so that it may respond readily to any inequality in the upper without disturbance of
 115 the shoe in the hands of the operator other than the proper adjustment of the inseam guide against which alone the shoe is pressed and by which it alone is guided. Thus, at no time can said feeler serve either alone or in
 120 conjunction with the inseam guide as a guide for the shoe; it has no sufficient support or resistance for a guide; it is merely a feeler which indicates when and to what extent the real guide 1 shall be adjusted.
 125

The trimming or chopping knife 3 (see Fig. 5) is attached by screws 3^a to the forward end of a knife slide 29, which latter is pivoted at its rear end at 29^b to a block 29^a mounted to slide in a guide-way 32 of the knife carrier
 130

30, the latter being pivotally mounted at the rear of the machine upon the same pivot 11 upon which the inseam guide arm 10 swings. The knife slide 29 is of less width than the guide-way 32, to permit the knife carrier 30 after having swung to one side to give feeding movement to the knife, to return with the inseam guide carrying arm to their normal positions while permitting said knife to remain locked as hereinbefore referred to, to hold the work stationary during the return movement of the inseam guide and presser for a new grip preparatory to a new feed pressure.

The forward or trimming stroke of the knife is effected by a vertical lever 33 (Fig. 2) fulcrumed at 33^b engaging a downward extension 34 of the knife slide 29 through the intervention of a sliding block 35, which slides in a transverse way 36 of said extension 34. The guide-way 32 of the knife carrier 30 extends entirely through said carrier from top to bottom thereof and the support for the knife slide 29 is afforded by a plate 37 secured to the under side of the carrier 30, said plate having an opening 38 through which the extension 34 of the knife slide projects, the opening being of sufficient length to permit of the trimming stroke of the knife.

The trimming knife 3, in its forward and cutting movement chops upon or against a suitable block 61 (see Fig. 12), which is slidably mounted upon the inner face of the inseam guide 1 and is connected by a finger 62 Fig. 1 with the forward extremity of the knife carrier 30, whereby said block is maintained in the same relative position with respect to the trimming knife, regardless of the vertical adjustment of the inseam guide with respect to said knife; so also, when the knife is adjusted vertically, it carries with it the said chopping block, so that the two are always in proper register one with the other. The finger may be secured in any convenient manner (not shown) upon the knife carrier 30. The operating lever 33 for the knife slide is actuated from path 39^a, in a cam wheel 39 on the main shaft of the machine, through the friction roll 33^a.

The presser 2 (Fig. 2) which engages the tread surface of the shoe sole is carried by a swinging arm 40, pivoted at its upper extremity at 41 on a lug 42 which extends upwardly from the knife carrier 30, said swinging arm being prolonged to form an operating handle 43, whereby the presser may be pressed rearwardly by the operator to admit the sole between itself and the inseam guide 1.

The clamping movement of the presser 2 is effected by means of a thrust bar 44, (Figs. 2 and 3) which is slidably mounted in the knife carrier lug 42 that carries the clamping arm 40. This thrust bar and consequently the arm and its clamp are normally pressed forwardly by the spring 45, encircling the

bolt 46, secured to the lug 42 of the knife carrier. This bolt 46 passes through a lug 47 on the thrust bar 44, between which lug and a head 48 on the said bolt a spring 45 operates to afford spring clamping action to the clamping presser 2. The bolt 46 may be secured against accidental turning by means of a pinch screw 49 in the lug 49^a. In order to release the sole of the shoe from the clamping action of the presser 2 periodically at the end of each feeding movement, the thrust bar 44 has its rear extremity jointed to a cam lever 50 pivoted at 51 to the frame of the machine and provided with a friction roll 52 which is actuated by the peripheral cam 39 to draw the thrust bar 44 rearwardly and thus release the presser 2 from the spring pressure, thus allowing said presser 2 to swing loosely from its pivot 41.

The common pivot 11 of the inseam guide arm 10 and the knife carrier 30 is mounted on the vertical sleeve 54 of the bolt 55 at the rear of the machine, whereby the inseam guide 1, the presser 2 and the trimming knife 3 may all have lateral feeding movement to feed the work for successive trimming operations, and at the same time effect the channeling of the shoe sole by carrying the sole past the laterally fixed channeling knife 4 during such feeding operation. The lateral feeding movement of the parts mentioned is effected by means of face cams, 56 and 57, upon opposite sides respectively of the cam wheel 39, one of which engages a friction roll 58 upon a stud 59 depending from a lug 60 on the guide arm 10, and the other of which engages a second roll 61 mounted upon a forwardly projecting arm 62 at the base of the sleeve 54, and shown in dotted lines Fig. 2.

To lock the knife carrier and hold it at the end of its feeding movement, I have provided a dog 63 (Figs. 2 and 5) which is pivoted in the aperture 64 of the knife slide 29 and which upon forward movement of the knife slide engages an upwardly projecting finger 65 (see Fig. 2) at the side of the knife carrier and is swung rearwardly against the action of a suitable spring 63^a, so that when the knife carrier together with the knife slide, is swung laterally to the left on the feeding stroke, the dog 63 swings forward under the action of its spring into alinement with the finger 65 and there locks its slide. When the knife carrier 30 is returned laterally to the right to return the presser 2, the dog 63 and finger 65 serve to maintain the knife slide locked in position at the end of the feeding stroke. When the knife slide is again moved rearwardly to withdraw the knife from the work, the dog 63 is drawn back from behind the finger 65 and at the same time another dog 66 (see Fig. 5) pivoted upon the opposite side of the knife slide 29 in the recess 67 and normally spring-held by a spring 66^a in rearward position in said recess rides up over a cam face 68

at the side of a guiding slot 32 of the knife carrier, and through its spring throws the knife over into its normal position against the opposite wall of said guiding slot. As the knife is withdrawn, this second dog 66 drags into a second recess 69 in the side of the guiding slot 32, so that when the slide is again moved forward upon another trimming stroke, if the spring action of the dog 66 for any reason has failed to fully return the knife slide to its normal position, the end of the said dog 66 acting against the beveled forward wall 69^a of the said second recess 69 will positively complete the lateral return of the knife slide.

In the operation of the parts thus far described the presser 2 is pressed rearwardly by the operator and the welt of the shoe brought against the inner surface of the inseam guide 1 with the extremity of said guide bearing against the inseam at the bottom of the crease. Upon release of the handle 43 the shoe is securely held by and between the guide 1 and presser 2 and the machine is then started, whereupon the trimming knife moves forward through the material of the sole. Upon completion of the trimming stroke of the trimming knife, the guide 1, presser 2 and trimming knife 3 are together moved laterally, to the left, to effect the feeding of the work, during which stroke the stationary channel knife 4 engaging the bottom or tread surface of the sole cuts a channel at a predetermined distance from the trimmed edge thereof. Upon the completion of the feeding stroke, the trimming knife 3 which is now locked by the dog 63 against side movement is retracted slightly to free it from the chopping block 61; and at the same time the presser 2 is automatically released from its clamping action upon the sole and said presser and inseam guide 1 are returned to their initial positions to the right. During this return movement of these members the work is held against retrograde movement by the locked knife and the channel knife 4. After the presser and inseam guide have completed their return movements and have again seized the work the knife is wholly withdrawn from the work and returned as described to its initial retracted position and alined for the next succeeding trimming stroke. It is not essential that the handle be connected to and attached to the presser as described, as under some conditions it may be desirable to avoid the handle vibrations incident to this form of construction, in which case the skill of the mechanic will dictate the proper mounting of the handle on the frame and other incidental changes in details.

In order to form a "Scotch" or "Baltimore" extension edge around the ball of the shoe the knife 3 is moved vertically with respect to the inseam guide 1. The mechanism

to effect this consists of a cam 70, see Figs. 14 and 15, on the main shaft A of the machine, upon which rolls a roll 71 carried by the arm 72 which is pivoted at 72^a at the rear of the machine and which, at its forward extremity, also carries a wedge guide 73, between which and the knife carrier 30 is interposed a wedge 74 which to vary the height of the knife carrier 30 is thrust forward and withdrawn from between said carrier and the guide 73 by an arm 75 (Fig. 3) pivoted at 76 to the frame of the machine, the parts being so arranged that the wedge 74 is shifted by mechanism to be described and the cam projection 70^a on the cam 70 comes beneath the roll 71, (Fig. 15), just as the trimming knife is about to enter the work, so that the level of the succeeding cut of said knife will be determined by the forward or rearward position of the said wedge 74. As soon as the knife has entered the work and is held thereby the cam projection 70^a on the cam 70 passes from beneath the roll 71, permitting the wedge to drop slightly and thereby ease its contact with the knife carrier 30, so that said wedge may be readily shifted by the next movement of the arm 75.

For the purpose of actuating the wedge 74, the arm 75 (see Figs. 3 and 6) is provided with a foot 77, engaged by a V-shaped rib 78, carried by the upper end of the rocking plate 79, which oscillates upon a horizontal pivot 80 (Fig. 10) and is provided at its upper extremity with a roller stud 81, Fig. 3 which is engaged by the rotating pattern 82. The foot 77 is preferably made separately from the arm 75, and is provided with a lug 77^a, opposed to a lug 75^a, on said arm 75, and a spring 77^b is interposed between said lugs (Fig. 6) to take up movement of the foot 77, in case, for any reason, the arm 75 is prevented from moving, thus obviating breakage of the machine.

Referring to Fig. 3, the pattern 82 is provided with two pattern surfaces, each extending throughout one half the circumference,—one pattern surface to determine the width of extension of the sole of a right shoe, and the other the width of extension of a left shoe. This pattern is rotated always in one direction, and to this end is fast upon a vertical spindle 83 (Figs. 3, 6 and 7) journaled in arms extending from a bracket 84 (Fig. 7) secured to the frame of the machine by bolts 84^a, Fig. 1. Between the bearings in the bracket 84, this spindle 83 has fast upon it by a pin 85, a sleeve 86, carrying a pair of oppositely wound spiral spring-like clutches 87, which normally loosely surround the sleeve. The adjacent inner ends of these spring clutches are secured to said sleeve 86, while the other or free ends are respectively fastened to the clutch actuators or arms 88, journaled on the opposite ends of the sleeve 86. When either

clutch actuator is rocked in the direction of the wind of its clutch member 87, indicated by the arrow (Fig. 6), said clutch contracts and grips the sleeve 86 and rotates it together with the spindle 83 and pattern 82, but when rocked in the opposite direction, said clutch enlarges and slips easily on said sleeve without rotating it. The clutch actuators 88, are respectively provided with adjustable faces furnished by contact screws 89, each adapted to be engaged by one of two rocking transmitters 90 (Figs. 6, 7, 8 and 9) mounted like the leaves of a hinge upon the horizontal stud 91 on the bracket 84. The transmitters 90 are respectively actuated by cam levers 92, pivoted upon the top and bottom ends of a pin 93 of the bracket 84, said cam levers, at their free ends (Figs. 6 and 7) being provided with friction rolls 94, which follow the cam path 95 of the cam 96 fast on the main shaft A of the machine, said friction rolls being located upon opposite sides of said shaft, as shown.

To vary the throw of the transmitters 90 by the levers 92, said levers have adjustably mounted thereon the contact blocks 97 having knife edge bearings 98 which engage said transmitters 90 on the opposite sides of the latter from the contact screws 89 of the clutch actuators 88. Obviously, as the knife edge bearings 98 of the cam levers and the contact surfaces of the screws 89, or either of them, are adjusted toward or from their respective pivots, to vary their effective radial lengths, so will the rocking movements transmitted to the clutches 87 likewise vary, thereby varying the rotative movement of the pattern 82.

For the purpose of adjusting the knife edge bearings 98 along the cam levers 92, in order to vary the effective throw of the rocking members 90, said bearings are provided respectively with studs 98^a (Fig. 6) upon which are mounted the slides 99 which are engaged by the forked ends of the yoke 100 (see Figs. 6 and 9). This yoke is moved to vary the knife edge bearing by a rack slide 101 connected thereto and itself actuated by a segmental gear 102 (Fig. 6), adjustment of said yoke through said segmental gear being effected by means of a scale lever 103 (Fig. 3) secured to the gear spindle and extended toward the front of the machine into convenient position to be moved by the operator. A suitable scale 104 is arranged in juxtaposition to the free end of the adjusting lever 103, said scale being graduated and marked to indicate the necessary adjustments of the lever required for giving to the pattern 82, the step by step movement needed for various sizes of shoes; the successive rotative steps of the pattern being shorter for the larger size of shoes than for the smaller, in order that said pattern may complete its full rotation in the shorter time required for the ma-

chine to make the circuit of a smaller shoe as compared with a larger one.

As shoes increase in size the rate of extension should also be increased in order to maintain the same proportional effect throughout the entire run of sizes and to provide for increment of extension or adjustment of the trimming knife for the successive sizes of shoes, I have provided means for adjusting the knife edge bearings 78 with respect to the foot 77 of the wedge operating lever, thereby to increase the length of successive movements of the wedge 74 as the sizes increase. To this end the V-shaped rib 78 (Fig. 6) hereinbefore stated to be adjustably mounted on its rocking plate 79, is carried by a slide 105 (see Figs. 1 and 10) which is mounted in a guideway 106 in said rocking plate 79. Also, upon the slide 105 is mounted an abutment 107 (Figs. 1 and 6) which forms with the rib 78, a vertical guideway 108 to receive the circular upper end 109 of a link 110 pivoted at its lower end at 111, to the rack slide 101 (see Fig. 10) hereinbefore referred to. The link 110 is slotted at 112 to receive a stud 113 (Figs. 9 and 10), which, at its inner end, extends through a corresponding slot 116 in the rocking plate 79, said stud 113 thus serving as a fulcrum about which the upper end of the link 110 is rocked, by the rack 101, to adjust the contact rib 78 back and forth upon said rocking plate to vary the wedge movement transmitted by the rocking plate, wherein said rib is moved to meet varying sizes of shoes. To hold the stud 113 in its said adjusted position, I have provided it with a circular head 114 adapted to be seated in one or another of the circularly shaped recesses 115, countersunk along the inner face of the slotted rocking plate 79. The stud 113 may, if desired, be provided within the slot 116 of the rocking plate with a sliding block 117 to provide a better slide bearing. The outer end of the stud 113 is provided with a head 118, between which and a cup 120 loosely mounted on the stud is arranged a coil spring 121, which tends normally to hold the inner head 114 of the stud seated in its recess 115, at the opposite side of the rocking plate.

The axis of the stud 113 when located at the upper end of the slot 112 in the link 110, is coincident with the axis of the circular upper end of said link, hence movement of the lower end of the link by its rack 101, merely turns the upper end thereof about its coincident centers and causes it to rise and fall in the guideway furnished for it without imparting thereto any lateral or longitudinal movement thereof to move the contact rib on the rocking plate described. If, however, the stud 113 is adjusted to seat its head 114 in one of the lower countersunk recesses 115 in the plate 79, swinging adjustment of the lower end of the link 110 by the rack 101 will

cause its upper end of said link, now above the axis of the stud 113, to have a lateral or forward and back movement that is imparted to and for correspondingly adjusting the rib 78 and correspondingly varying the increment of movement of the knife adjusting wedge 74, thus providing for a proportionate variation in the extension of sole whenever the position of the size adjusting lever 103 is changed.

It will be remembered that the pattern 82, has two pattern surfaces, one for a right, and the other for a left shoe, consequently since the mechanism as a whole operates continuously, it becomes necessary to stop rotation of the pattern at or toward the end of each rounding operation and to hold it at rest until a new or mating shoe is positioned, when it should be again set in motion to handle such new shoe. To this end the sleeve 86 to which the pattern is connected is provided (Fig. 8) upon diametrically opposite sides with the projections 122 which are adapted to engage a plate spring 123 carried by the rear of the bracket 84 (Figs. 7 and 9). This spring carries a yoke 124 (Figs. 7, 8 and 9,) the extremities of which overlie ears 88^a upon the clutch actuators 88 and press the contact screws 89 of said actuators against the transmitters 90 and hold the latter in turn against the knife edge bearing 98 of the cam levers 92 (see Figs. 6 and 9). When, however, in the rotation of the pattern either of the projections 122 on the sleeve 86 come beneath the spring 123, they force said spring outwardly and thereby press the yoke 124 away from the clutch actuators 88, permitting the spring clutches and said actuators to remain away from the rocking transmitters 90 and stopping the pattern but leaving it as a necessary support for maintaining the pattern controlled wedge 74 in fixed position during the remainder of the rounding operation of the shoe. To again set the pattern in motion at the proper time after a new shoe has been positioned, a starting mechanism is provided, consisting of a vertical lever 125 (see Figs. 1 and 11) mounted upon a rock shaft 126, upon which is also mounted an arm 127 connected by means of a treadle rod 128 to a suitable treadle hereinafter described. Projecting from the upper free end of the lever 125 is a rotatable pin 130, to the end of which is pivoted a starting dog 129, provided with a stop finger 134 a spring 131 secured to the lever 125 and said pin 130 serving to swing the pin and its dog horizontally into the path of rotation of a pair of diametrically arranged starting pins 132 (Fig. 3) depending from the under side of the pattern.

Referring to Fig. 3, as the pattern in its rotation approaches the end of a semi rotation, i. e., near the end of a complete operation upon one shoe, one of the depending

pins 132 will strike the side of the dog 129 and swing the latter to one side to enable it to pass. After the pin passes the dog, the dog spring 131, swings the dog back to its normal alinement where it is arrested by contact of its stop finger 134 with the pin that deflected it. The depending pins 132 are arranged upon the same diameter of the pattern to that upon which the projections 122 on the sleeve 86 are located, so that when either of the pins reaches a position relative to the starting dog 129 shown in Fig. 3, one of the sleeve projections 122 will at the same time have engaged the spring 123 and thrown the clutch actuators out of operation and will have stopped the pattern. When, now, it is desired to start the pattern, the lever 125 is rocked forwardly by the treadle connection 128, whereupon the dog 129 engages the depending pin 132 in front of it and pushes the pattern ahead, thereby rotating the sleeve 86 sufficiently to move the projection 122 upon said sleeve from beneath the spring 123, thereby permitting the clutch actuators to again be thrown into operative position with respect to the cam levers 92; and the pattern thus set in rotation continues until the opposite projection 122 reaches and lifts the spring 123 and again stops the pattern at the end of one-half a revolution. It will be seen therefore that the starting of the pattern is entirely under the control of the operator, who starts it when he has positioned a shoe to be rounded but when said pattern has once been set in motion, it is controlled in its movement exclusively by the operation of the machine and cannot be again stopped, except by the stopping of the machine, until it has traveled throughout one-half a revolution or throughout the full extent of one of its pattern faces, when the rounded shoe is ready for replacement by a new shoe.

The channel knife 4 (see Fig. 1) as heretofore described is mounted upon the block 5. To permit of change in the elevation of the channel knife relative to the line of cut of the trimming knife 3, said block 5 is slotted horizontally at its forward or upper end at 147 to receive the block pivot mounted on one arm of a T-shaped lever 144, fulcrumed at 135 upon an ear depending from the trimming knife carrier 30, so that except when moving from the shank to the ball and vice versa, whenever said knife carrier is raised or lowered to vary the width of extension of the sole, said block and its channel knife 4 will be correspondingly raised or lowered so as to retain the channel at a uniform, predetermined distance in from the sole edge whatever be the extension thereof. Said block 5, at its inner and lower ends, has pivoted thereto at 138 a link 137, hung at 139, also from the trimming knife carrier, thereby to support the inner end of said block to move with said carrier. In order that the block 5 may be

pressed constantly forward to project its channel knife 4 beyond the presser 2, and in position to cut a channel in the sole while being fed past said presser, said block 5 is drilled at 140 to receive a spring 141 which is seated against an adjustable stop screw 142, said spring at its opposite end being seated against a block 143 pivoted to the link 137. The spring 141 being seated in the block 5, and acting against the link 137, that is connected at its lower end also with said block 5, tends to throw rearwardly the upper end of said link, which being vertical, secures said spring to push itself and the block 5, in the opposite or outward direction against the inner face of the presser 2.

In order to simultaneously swing the channel knife toward the trimming knife at the starting of the pattern cam to thereby cut the channel nearer to the edge around the fore part than along the shank, a T-shaped rocking lever 144 is mounted on the stud 135, the forward arm of which is provided with a stud 145, which projects through a slide block 146 in a slide way 147 in the forward end of said block 5. The downwardly extending arm of the T-shaped rocking lever 144 is connected by means of a link 148 with the lever 125 at the rear of the machine, which operates the pattern dog 129. When said dog carrying lever is moved forward to set in motion the pattern, it acts also through the link 148 to swing the T-shaped lever 144 about its fulcrum and thereby lift the forward end of the block 5 with its channel knife 4. The dog carrying lever and block 5 are held in these positions, with the channel knife cutting its channel close to the trimmed edge, usually throughout the contour of the fore part and until the shank is reached at the opposite side of the shoe, when said lever is released and permitted to return to its normal position, returning also the channel knife to its normal or lowermost position for cutting along the shank. The movements of the channel knife with respect to the trimming knife 3 are limited by means of the stop screws 149 projecting downwardly from a lug 136 at the side of the trimming knife carrier and contacting respectively with the oppositely extending arms of the T-shaped rocking member 144.

To allow for a larger amplitude of swing of the dog carrying lever 125 at the rear of the machine than is required to move the channel knife, the link 148 which connects the channel knife with said lever, is forked at its rear end at 150 to straddle a stud 151 on said lever; the lower prong of the fork being provided with a depending lug 152, which projects between the oppositely acting free arms of a spring 153 mounted upon a stud 154 also upon the lever 125 and normally pressing against opposite sides of a stop lug 155. Any excess of movement of the lever

125, beyond the movement permitted of the link 148 and its channel knife, results in moving one of the arms of the spring 153 away from its stop lug 155. When said lever 125 is released, said spring arm returns the lever to its normal position centered between the opposed spring arms.

The peculiar form of treadle mechanism which I prefer to employ for operating the rod 128 and its dog carrying lever 125, is illustrated in Figs. 18 and 19, in which the treadle arm is shown at 156, pivoted at 157, upon a suitable support 158. This treadle arm is provided at its forward end with a treadle plate 159, pivoted thereto at 160 and provided at its heel end with a stop 161, which contacts with the extreme forward end of the treadle arm 156 and determines the upper position of the treadle plate. The toe end of the treadle arm 156 is forked, and between the forked arms is pivoted, at 162, an auxiliary treadle arm 170, the outer end of which contacts with the toe end of the treadle plate 159, and the inner end of which has pivoted to it the treadle rod 128, hereinbefore referred to, and which connects with the dog carrying arm 125 to operate the cam pattern and the channel knife. At the pivot point 162 of the treadle arm 156 also is connected a treadle rod 171, which leads to and serves to operate a suitable clutch or other starting or stopping mechanism of the machine but which is not herein shown.

The operation of the machine may be summarized as follows:—The operator first places his foot upon the treadle plate 159, and, throwing his weight upon the heel end thereof and keeping said plate resting squarely upon its fulcrum 160 and stop 161 depresses the treadle arm 156, carrying with it the auxiliary treadle 170, but without moving it relative to said main treadle arm 156. This depression of the main treadle arm acts to pull down upon the rod 171 and throw in the clutch to start the machine, which sets in motion the trimming knife and the lateral feeding movements of the inseam guide and presser. The operator next throws inward the presser lever 43 to withdraw the presser 2, to permit the edge of a sole of a shoe to be rough rounded to be inserted between said presser and the inseam guide with the edge of the latter firmly seated in the bottom of the crease of the inseam, whereupon the operator releases the lever 43 and permits the presser to be thrown forward by its spring with a firm feeding contact with the bottom of the sole, thereby to feed the sole step by step. The trimming knife which was set in operation simultaneously with the presser and inseam guide acts immediately to trim the edge of the sole by successive cuts therethrough, said knife after each cut moving to the left with the inseam guide and presser to feed the sole

against the stationary channel knife to cause the latter to cut the channel as fast as the work is fed. As stated, at the end of each feeding movement the trimming knife with-
 5 draws slightly within the work and is there locked and held at rest to hold the stock while the in-seam guide and presser return to their original positions for a new engagement with the work, after which the trim-
 10 ming knife is withdrawn, released and also returned to its original position for a new cut.

The knife being used as a feeding element of the machine and also as a means for pre-
 15 venting retrogression of the work while the in-seam guide and presser return in frictional contact with the work to their normal positions, said trimming knife may be and preferably will be somewhat like a gouge that is,
 20 shaped to present either a curved cutting edge at its end or a straight cutting edge with a vertical lip at one or both ends of the cutting edge. A knife thus shaped will, so to speak lock itself in the work so far as lat-
 25 eral movement of the work relative to the knife is concerned, and will therefore furnish the requisite grip for feeding the work forward against the considerable resistance of the stationary channeling knife, and will
 30 also insure the retention of the work in its new position during the return of the guide and presser to their original positions. It is important that the designed feed be insured for each cut of the trimming knife, in order
 35 to preserve a proper relationship between the strokes of the cutting knife and the feeding movements of the pattern. The latter is designed to move throughout a given portion of its circumference during a given num-
 40 ber of strokes of the cutting knife, and if the cutting knife did not progress around the fore part of the shoe as rapidly as intended, the pattern mechanism would complete its work before the fore part had been rounded
 45 and thus a distorted shape of sole would result. The arrangement and construction of devices hereinbefore referred to insures accuracy and certainty of feed at all times.

As hereinbefore stated, the in-seam guide
 50 serves as the sole guide for the work throughout the entire contour of the shoe, not only along the sides of the shank thereof, but around the fore part as well, so that the machine has but a single guide and for a very
 55 large proportion of shoes to be operated upon, this guide alone would undoubtedly be entirely sufficient, for in a majority of cases the line of the in-seam is sufficiently accurate with reference to the outline of the last.

60 The feeler 6, as has been stated, is merely a feeler and not a guide and therefore does not mar nor soil the upper at any point because it does not bear with sufficient pressure thereon. Should the operator care-
 65 lessly tilt the shoe so as to throw the upper

against said feeler with a pressure such as would constitute said feeler a guide if rigidly supported, said feeler as here shown, will immediately give way before the shoe and go into the air, making it impossible at any
 70 time to cause the latter to press upon the upper with such a pressure as is necessary for guiding, as would mar or soil the upper. This feeler merely feels for inequalities or unevennesses in the in-seam, which is the
 75 true guide, and when it finds any unevenness or irregularity it causes the in-seam guide to be adjusted to the unevenness or inequality, so that the line of cut thus produced from the in-seam is accurate and prop-
 80 erly proportioned with reference to the intended in-seam.

When the machine is started the pattern remains at rest, because both of the spring
 85 clutches are held out of operation by one of the projections, 122, Fig. 9, holding the spring plate 123 out and away from the clutch actuator.

When trimming along the shank it is desirable as described, to keep the trimmed
 90 edge as close as possible to the in-seam and to permit this without danger of cutting the in-seam, the channel along the shank is cut farther in to the sole relative to the in-seam
 95 guide and trimmed edge than around the fore part. When, however, the fore part is reached at either side of the shoe, the operator who has maintained his foot upon the
 100 treadle as first depressed, and without releasing the said treadle, tips his foot forward, thereby depressing the toe end of the treadle plate 159 about its fulcrum 160,
 105 thus depressing the outer end of the auxiliary treadle lever 170; causing the inner end of said lever to lift the auxiliary treadle rod 128, causing the latter to throw forward the
 110 dog carrying lever 125 to cause its dog to catch the pattern and move it forward to a given predetermined position, at which its extension forming peripheral portion be-
 115 comes effective, said dog carrying lever at the same time throwing into operation the spring clutches to further rotate said pattern during the subsequent operation of the
 120 machine. In the further operation of the machine the rotation of this pattern by varying the position at each stroke of the knife of the wedge 74 varies the elevation
 125 of the trimming carrier relative to the in-seam guide, causing the trimming knife to cut its path at a distance from the in-seam and along a line which may be at a constant
 130 distance therefrom or variable that is determined by the contour of the pattern, so that the trimmed edge becomes a substantial reproduction of the pattern contour. Of course, any desired outline of sole may thus be obtained by employing a properly shaped pattern; and this pattern is so proportioned that for a given number of strokes

of the trimming knife necessary to trim around the fore part of the largest shoe, said pattern will make substantially one-half a revolution to furnish the necessary outline.

5 While there are two spring clutches operating each intermittently upon and to rotate the pattern, the resultant rotation imparted to the pattern is continuous and not step by step, at least continuous to the extent that it
10 never stops between successive actions of these clutches. Notwithstanding the pattern is thus substantially continuously rotated, the use of the alternately acting spring clutches enables me to vary the rate
15 of rotation so as to cause the pattern to make its semi-rotation in less time for a small shoe than for a large shoe, as, of course, is necessary, because the same number of strokes of the trimming knife required to trim around
20 the fore part of a large shoe, would not be required for a small shoe. This variable feeding movement of the clutches is obtained by varying the position of the knife edge bearing 98, Fig. 6, along its cam operated lever 92.
25 Obviously, the cam operated movement of the lever being the same, if motion is transmitted from it to the hinge-like transmitters at varying distances from the fulcrum of the levers, transmitted motion will be greater or
30 less, as the case may be, hence the movements of the clutch actuators are varied. This adjustment of the knife edge bearings on their said levers is obtained, as has been described, by adjustment of the index lever
35 103, stated to be adjustable according to the size of shoe to be operated upon and which when moved to vary the rate of feed of the pattern (see Fig. 6) varies the position of the knife edge bearing 78, relative to the foot 77
40 of the lever 75 that controls the position of the wedge 14, Fig. 15, to vary the separation of the inseam guide and trimming knife carrier to obtain a proportional increase or decrease of width in extension as the sizes of
45 the shoes vary. My machine therefore provides what is in effect a variable pattern, varying in its effective length according to the distance required to traverse the fore part of a shoe, whereby the proportional increase and decrease in width of extension
50 produced, may always begin and terminate at relatively the same points around the outline of the shoe sole, whatever be the size of the latter. This I believe to be new; the
55 patterns heretofore provided in machines of this sort having been fixed patterns and invariable for different sizes of shoes with the result that an extension would be carried further around a small shoe than on a large
60 shoe with resultant variation in proportion displayed by the soles of different sizes of the same style of shoe. Also, I believe for the first time in this art my machine provides
65 means for varying the width of extension as the size of the shoe varies; also to preserve

the proportional effect, whatever be the size of shoe. Heretofore, so far as I am acquainted with the art, a given extension has been provided for by a machine and has been preserved throughout all the sizes, with the
70 resultant effect that the extension on a large shoe looked diminutive, while the extension for the small shoe was excessive.

It has been stated that in a large proportion of the shoes operated upon, the feeler
75 will not be required, and when not required, it may be turned upward into its dotted position, Fig. 1, the jack knife spring 6^b serving to hold it in its elevated position, where it will be ineffective to vary the adjustment of
80 the inseam guide.

It is to be understood that my invention is not limited to the particular embodiment here shown, but many changes may be made in the construction and arrangement of parts
85 without departing from the spirit and scope thereof.

1. In a machine for operating upon the soles of boots and shoes, the combination with an operating tool of a guide acting along
90 a given contour of the shoe, and correcting means acting to maintain the general guiding effect of said guide irrespective of local irregularities in the said contour.

2. In a machine for operating upon the
95 soles of boots and shoes, the combination with an operating tool of an inseam guide and means automatically to adjust said guide and tool relatively to vary the sole outline for irregularities in said inseam. 100

3. In a machine for operating upon the soles of boots and shoes, the combination with an operating tool of a guide acting along
a given contour of a shoe, and contour correcting means automatically to adjust said
105 guide and tool relatively to vary the guiding effect of said contour.

4. In a machine for operating upon the soles of boots and shoes, the combination with an inseam guide, an operating tool, of
110 inseam compensating means to compensate for discrepancies between the inseam and a given contour of a last within the shoe.

5. In a machine for operating upon the soles of boots and shoes, the combination
115 with a guide acting along a given contour of a shoe, and a tool adjustable with respect to said guide, of means also to adjust said guide to vary the guiding effect of said contour.

6. In a machine for operating upon the
120 soles of boots and shoes, the combination with a guide acting along a given contour of a shoe, a tool acting in conjunction therewith of a feeler and means coöperating therewith to cause said guide to be adjusted to vary the
125 guiding effect of said contour.

7. In a machine for operating upon the soles of boots and shoes, the combination with an operating tool and a guide acting
along a given contour of a shoe, of a feeler 130

and means coöperating therewith to cause relative adjustment of said guide and tool to compensate for errors in said contour.

8. In a machine for operating upon the soles of boots and shoes, the combination with an operating tool, of a guide, a feeler, and mechanism controlled by the relative position of said guide and feeler to vary relative positions of said guide and tool.

9. In a machine for operating upon the soles of boots and shoes, the combination with a trimming knife and a plurality of feeding jaws, all movable laterally to feed the work, of means to return the feeding jaws to initial position at the end of the feeding stroke, and means, subsequently to return said trimming knife to its initial position.

10. In a machine for operating upon the soles of boots and shoes, the combination with a trimming knife and a plurality of feeding jaws, all movable laterally to feed the work, of means to partially withdraw the knife from the work at the end of the feeding stroke, means to return the feeding jaws to initial position and subsequently to said return to fully withdraw the knife and return the same to initial position.

11. In a machine for operating upon the soles of boots and shoes, the combination of feeding jaws and a knife carrier bearing a trimming knife, all movable laterally to feed the work, one of said jaws being carried by said knife carrier, means to return said feeding jaws and knife carrier to initial position, means to hold said knife at the end of the feeding stroke during such return movement, and means subsequently to return the knife to initial position.

12. In a machine for operating upon the soles of boots and shoes, the combination of a trimming knife and a carrier therefor, of a channeling knife carried by said carrier to be initially movable therewith in maintaining the channel cut at a fixed distance from the sole edge and means for relatively moving the trimming knife and channeling knife to vary the distance of the channel from the sole edge.

13. In a machine for operating upon the soles of boots and shoes, the combination with a trimming knife for acting upon the edge of a sole and a carrier therefor, of a channeling knife pivoted to said trimming knife carrier, and stops to limit the pivotal movement of said channeling knife relatively to said trimming knife.

14. In a machine for operating upon the soles of boots and shoes, the combination with a trimming knife movable transversely to its cutting stroke to vary the shape of the sole, of automatic means under starting control only of the operator to control such transverse movement of the knife.

15. In a machine for operating upon the soles of boots and shoes, the combination

with a trimming knife movable transversely to its cutting stroke to vary the shape of the sole, of automatic means to control such transverse movement of the knife and means automatically to stop such knife controlling means.

16. In a machine for operating upon the soles of boots and shoes, the combination with a trimming knife movable transversely to its cutting stroke to vary the shape of the sole, of automatic means under starting control of the operator to control said transverse movement of the knife, and means automatically to stop the knife controlling means.

17. In a machine for operating upon the soles of boots and shoes the combination with a guide acting along a given contour of the shoe, of means for automatically adjusting said guide, said means being yieldable under pressure of the shoe against it in all adjustments of the shoe while on said guide.

18. In a machine for operating upon the soles of boots and shoes the combination of a movable guide for acting along a shoe contour, and means for automatically adjusting said guide, said means being yieldable under pressure of the shoe against it, thereby rendering it incapable of alone serving as a work guide.

19. In a machine for operating upon the soles of boots and shoes the combination with a guide acting along a given contour of the shoe, of a feeler and connections between it and the guide for determining the adjustment of the guide, said feeler being movable with respect thereto and having a range of movement greater than the extreme adjusting movement of said guide.

20. In a machine for operating upon the soles of boots and shoes the combination with a guide acting along a given contour of a shoe, of a feeler and means under control of the feeler for adjusting said guide and provisions for throwing the feeler out of operation upon movement thereof beyond that required to adjust the guide.

21. In a machine for trimming the soles of boots and shoes the combination with feeding means comprising clamping jaws and a trimming knife of a carrier for said knife provided with a lock to hold said knife at the end of a feeding stroke to prevent retrograde movement of the work during return of the clamping jaws to initial position.

22. In a machine for trimming the soles of boots and shoes the combination with a trimming knife and a guide coöperating therewith of a wedge and operating means therefor for changing the relative position of the knife and guide.

23. In a machine for trimming the soles of boots and shoes the combination with a trimming knife and a guide coöperating therewith of a wedge and operating means

therefor for progressively changing the relative position of the knife and guide.

24. In a machine for trimming the soles of boots and shoes the combination with a reciprocating trimming knife and means to operate it and a guide cooperating therewith, of a feeler and means under the control thereof for effecting relative adjustment of said knife and guide.

25. In a machine for operating upon the soles of boots and shoes the combination with a reciprocating trimming knife and means to operate it and a guide cooperating therewith, of a feeler and means adapted to be set in motion by said feeler to effect relative adjustment of said knife and guide.

26. In a machine for trimming the soles of boots and shoes the combination with a trimming knife, and a guide cooperating therewith, of means to vary the relation between said knife and guide during the operation of the machine to produce an extension edge on the sole, said means including a pattern having a plurality of successive pattern contours thereon, and means for moving said patterns in one direction to successively bring such pattern contours into action.

27. In a machine for trimming the soles of boots and shoes, the combination with a trimming knife and a guide cooperating therewith, of means to vary the relation of said knife and guide during the operation of the machine to produce an extension edge of the sole, said means comprising a pattern having successively arranged right and left pattern contours thereon, and means for moving said pattern to bring said right and left pattern contours successively into action.

28. In a machine for trimming the soles of boots and shoes the combination with a trimming knife and a guide cooperating therewith, of means to vary the relative position of said knife and guide to produce an extension edge on the sole, said means comprising a pattern having successive pattern contours for right and left shoes, and devices for moving said pattern in one direction.

29. In a machine for trimming the soles of boots and shoes the combination with a trimming knife and a guide cooperating therewith, of means to vary the relative position of said knife and guide to produce an extension edge on the sole, said means comprising a pattern, and means for imparting a variable continuous movement thereto.

30. In a machine for trimming the soles of boots and shoes the combination with a trimming knife and a guide cooperating therewith, of means to vary the relative position of said knife and guide to produce an extension edge on the sole, said means comprising a pattern having successively arranged pattern contours and means to vary its effective operation according to the sizes of shoes operated upon.

31. In a machine for trimming the soles of boots and shoes, the combination with a trimming knife and guide cooperating therewith, a pattern for determining the relative movements of the knife and guide, means for continuously moving the pattern throughout the trimming action of a shoe sole and means for grading the relative movements obtained from said pattern to produce variations in width of extensions corresponding to variations in the sizes of shoes.

32. In a machine for trimming the soles of boots and shoes the combination with a trimming knife and a guide cooperating therewith, of pattern means to vary the relative position of said knife and guide for producing a desired edge extension, and means for adjusting the pattern means for varying the widths of extensions for different sizes of shoes from one and the same pattern.

33. In a machine for trimming the soles of boots and shoes, the combination with a trimming knife and a guide cooperating therewith, of means to vary the relative position of the knife and guide to produce an extension edge on the sole, said means comprising pattern means having successively arranged pattern contours for right and lefts, one of which is effective throughout the entire rounding operation of a shoe, and means for grading the extension for different shoes.

34. In a machine for trimming the soles of boots and shoes the combination with a trimming knife and a guide cooperating therewith, of means for adjusting the relative positions of said knife and guide to produce an extension edge on the sole and a pattern continuously moving during the trimming action and cooperating with said adjusting means to determine the extent of adjustment in the production of different widths of extension.

35. In a machine for operating upon the soles of boots and shoes, a trimming knife, and a channeling knife, a guide cooperating therewith, a pattern for determining the relative position of said knives with respect to the guide, means for moving the pattern and for stopping the same, and means for starting the pattern and simultaneously moving the channeling knife with respect to the trimming knife at the commencement of the operation of the pattern.

36. In a machine for trimming the soles of boots and shoes the combination with a trimming knife and a guide cooperating therewith, of means including a wedge for adjusting the relative positions of said knife and guide to produce an extension edge on the sole, and a pattern mechanism cooperating with said wedge and controlling the adjustment thereof.

37. In a machine for trimming the soles of boots and shoes the combination with a trimming knife and a guide cooperating there-

with, of means for shifting the position of the trimming knife with respect to said guide to produce a "Baltimore" or "Scotch" edge, said means making intermittent contact with the knife carrier.

38. In a machine for trimming the soles of boots and shoes the combination with a trimming knife and a guide cooperating therewith, of means to adjust the relative positions of the knife and guide to produce an extension on the sole, including a pattern moving always in one direction to present a plurality of oppositely facing contours for rights and lefts.

39. In a machine for trimming the soles of boots and shoes the combination with a trimming knife and a single guide acting throughout the entire trimming operation along a given contour of the shoe, of feeler controlled correcting means automatically to adjust said guide for irregularities in said contour.

40. In a machine for trimming the soles of boots and shoes, the combination with means for feeding the work, of means for producing an extension edge on the sole, and means for controlling said extension producing means, said controlling means having a variable movement to cause said extension producing means to operate proportionately upon soles of different sizes.

41. In a machine for trimming the soles of boots and shoes the combination with means for feeding the work uniformly, of wedge operated means for producing an extension edge on the sole, and means for controlling said extension means and having a variable movement to cause said extension means to operate proportionately upon soles of different sizes.

42. In a machine for trimming the soles of boots and shoes the combination with means for feeding the work uniformly, of means for producing an extension edge on the sole, and a pattern for controlling said extension means and having a variable movement to cause said extension means to operate proportionately upon shoes of different sizes to vary the width of extension in accordance with variations in sizes.

43. In a machine for operating upon the soles of boots and shoes the combination with means including a single pattern for varying the width of the sole proportionately to the size of shoe being acted upon, of a channel knife and means for moving said knife independently of said means.

44. In a machine for operating upon the soles of boots and shoes the combination with means for varying the width of the sole, as desired, and means for proportionately varying the width thereof for different sizes of shoes of a channeling knife and means for shifting the path of operation thereof independently of said means.

45. In a machine for operating upon the

soles of boots and shoes the combination with an inseam guide of a feeler arranged independently of and to control said guide, and operative connections between said feeler and guide.

46. In a machine for operating upon the soles of boots and shoes the combination with a trimming knife and a guide cooperating therewith, of means automatically to vary the relative position of said knife and guide, and means controlled by the operator and acting through said automatic means to vary the width of the sole for different sizes of shoes.

47. In a machine for acting upon the soles of boots and shoes the combination of a guide and a tool having an adjustable relation to each other in determining the width of the extension edge, a position determining pattern and operating connections for determining such relation, and means in addition to the pattern for also adjusting the relation between the knife and guide during the operation of the machine.

48. In a machine for acting upon the soles of boots and shoes, the combination of a guide and a tool having a variable relation to each other in determining the width of the extension edge, a positioning pattern for determining such relation, means for varying the action of the pattern to proportionately vary the extension edge for shoes of different sizes, and a feeler controlled means for varying the relation of the tool and guide on occurrence of local irregularities of the guiding contour.

49. In a machine for acting upon the soles of boots and shoes, the combination with a trimming knife and a guide acting along a given contour of a shoe, of means to control the relation between the knife and guide in the production of an extension edge, and correcting means acting to maintain the general guiding effect of said guide irrespective of local irregularities in the said contour.

50. In a machine for acting upon the soles of boots and shoes, the combination with a trimming knife and a guide adapted to act along a shoe contour, of a pattern to control the relation between the knife and guide in the production of an extension edge, and feeler controlled means to vary the guiding effect of said contour.

51. In a machine for acting upon the soles of boots and shoes, the combination with a trimming knife and an inseam guide, of a pattern to control the relation between the said knife and guide in the production of an extension edge, a feeler acting along a shoe contour, and means cooperating therewith to cause relative adjustment of said guide and trimming knife on the occurrence of irregularities of the inseam contour.

52. In a machine for operating upon the soles of boots and shoes, the combination of

a trimming knife for acting upon the contour edge of a sole, a channeling knife, a guide disposed with relation to the trimming knife to determine the width of sole, a presser, and means for moving the guide, presser, and trimming knife transversely in unison to feed the work, and returning the guide and presser to initial position while the trimming knife and channeling knife remain fixed in the work, and provisions for thereafter withdrawing the trimming knife from the work and returning it to initial position for further trimming action.

53. In a machine for operating upon the soles of boots and shoes, the combination of a trimming knife for acting upon the contour edge of a sole, a guide disposed with relation

to the trimming knife to determine the width of sole, a presser, means for moving the guide, presser, and trimming knife to feed the work and returning the guide and presser to initial position, a channeling knife held stationary during the feeding action of the guide, presser, and trimming knife to thereby cut the channel, and provisions to thereafter withdraw the trimming knife from the work and return it to initial position.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ANALDO M. ENGLISH.

Witnesses:

RALPH C. POWELL,

ROBERT H. KAMMLER.