May 31, 1938. T. H. SEELY 2,118,825

SPLITTING MACHINE

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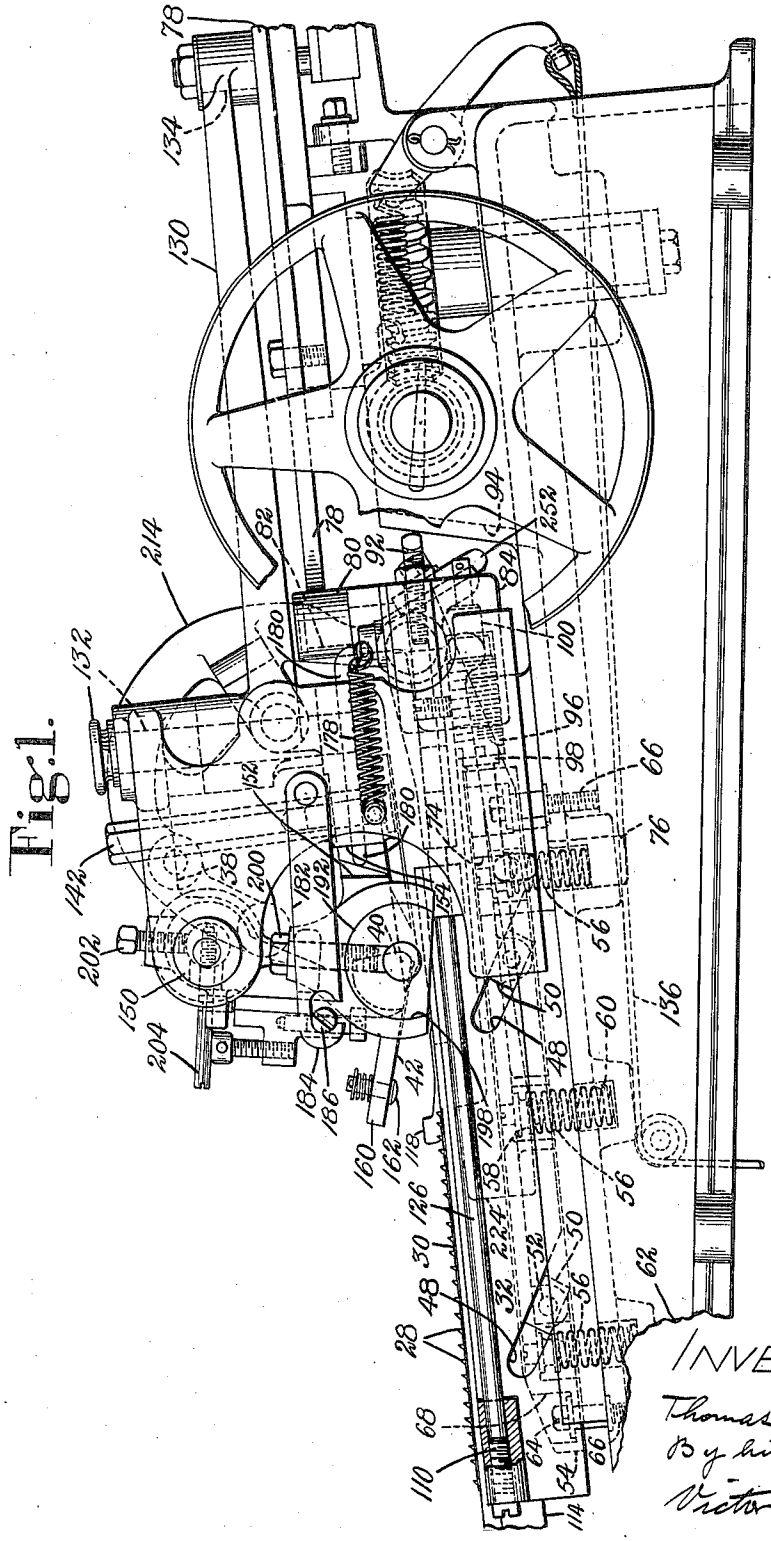
Fig. 1.



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By his attorney

Victor Cobb.

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SPLITTING MACHINE

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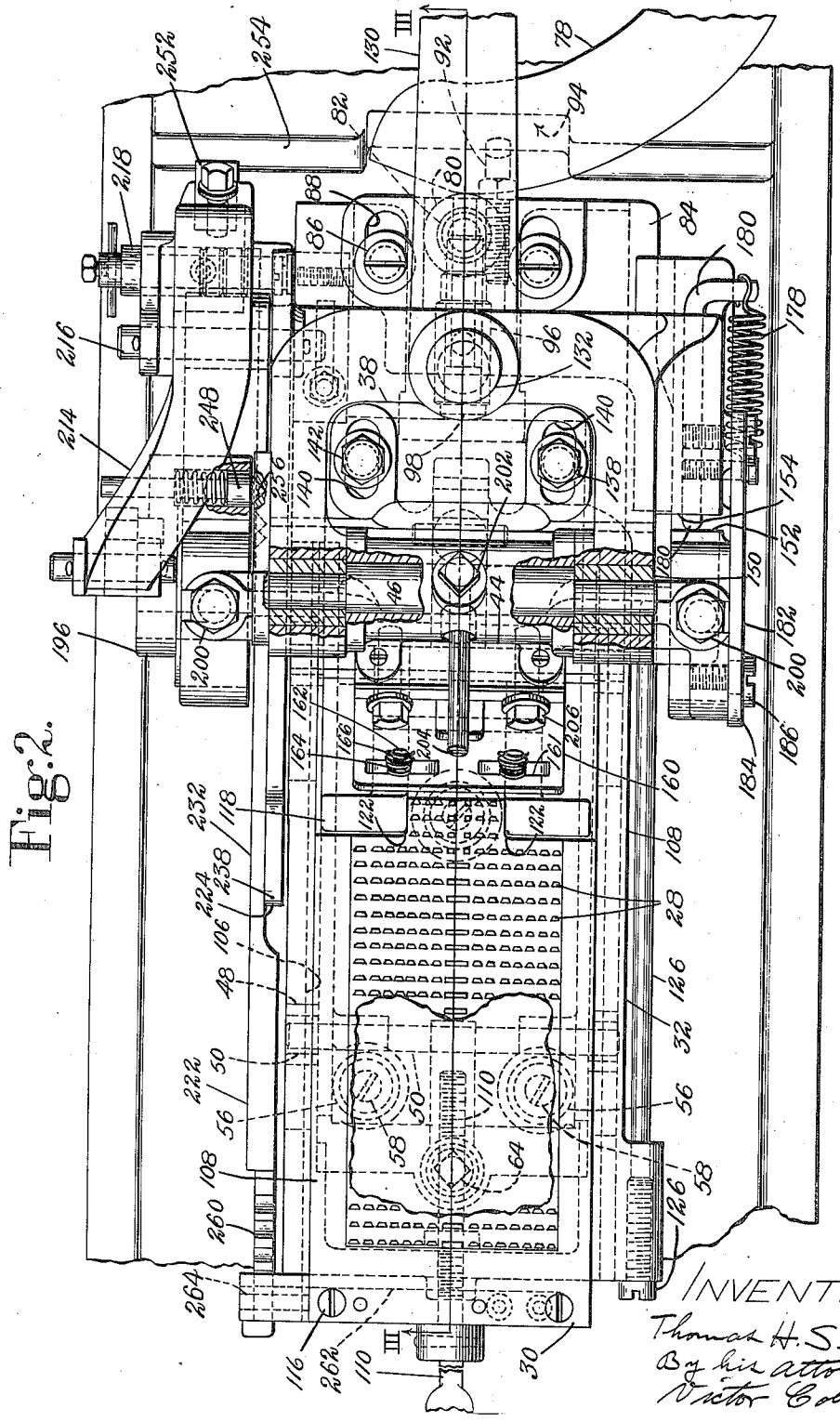

Fig. 2.

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SPLITTING MACHINE

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Fig. 3.

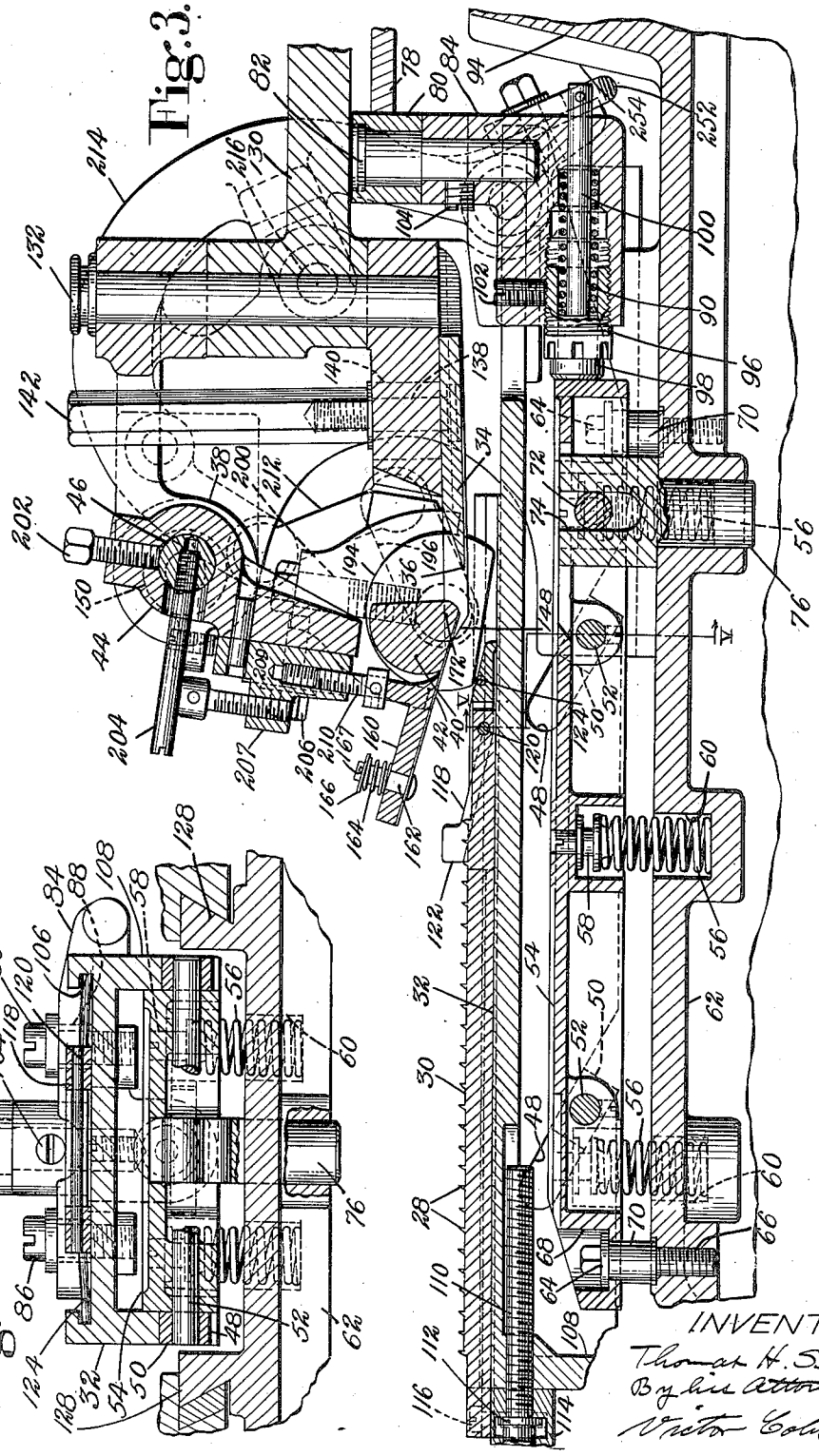
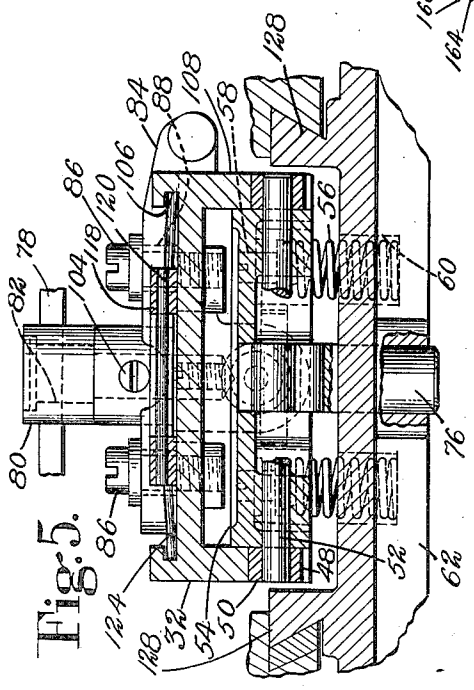


Fig. 5.



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SPLITTING MACHINE

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Fig. 4.

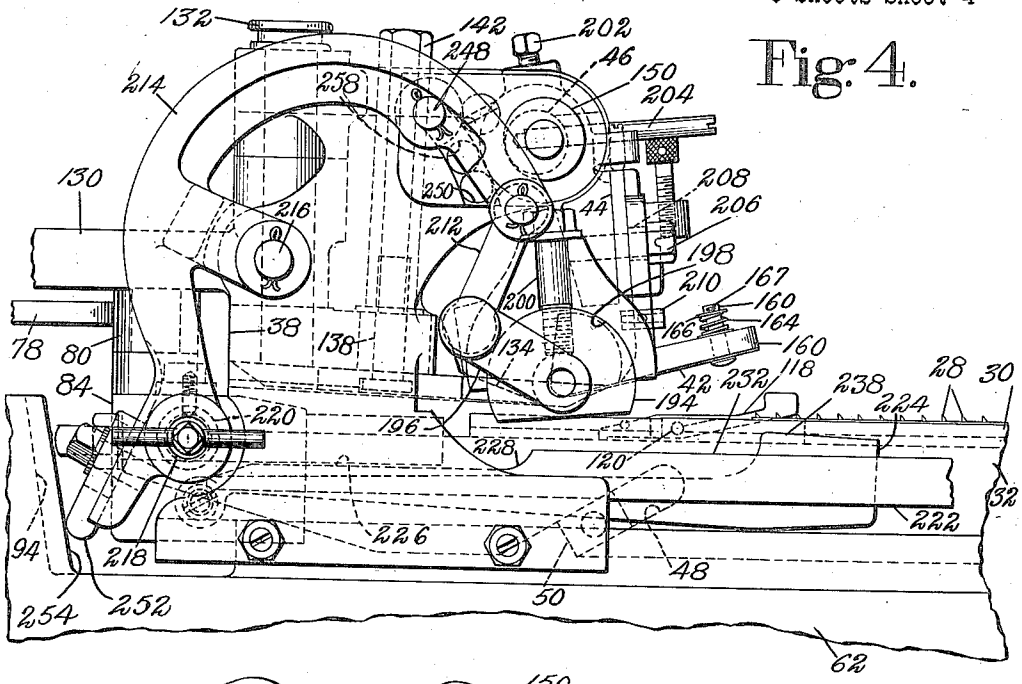

Fig. 6

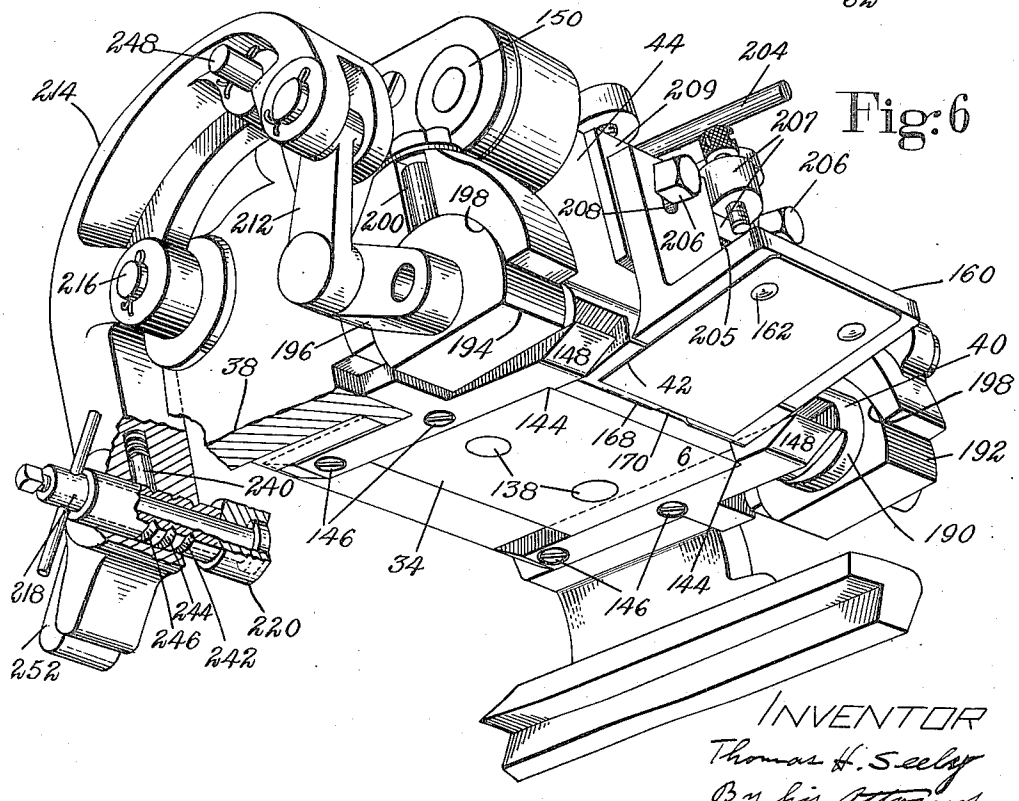

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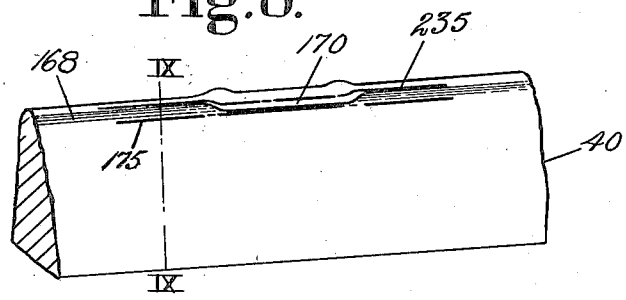
Fig:8.



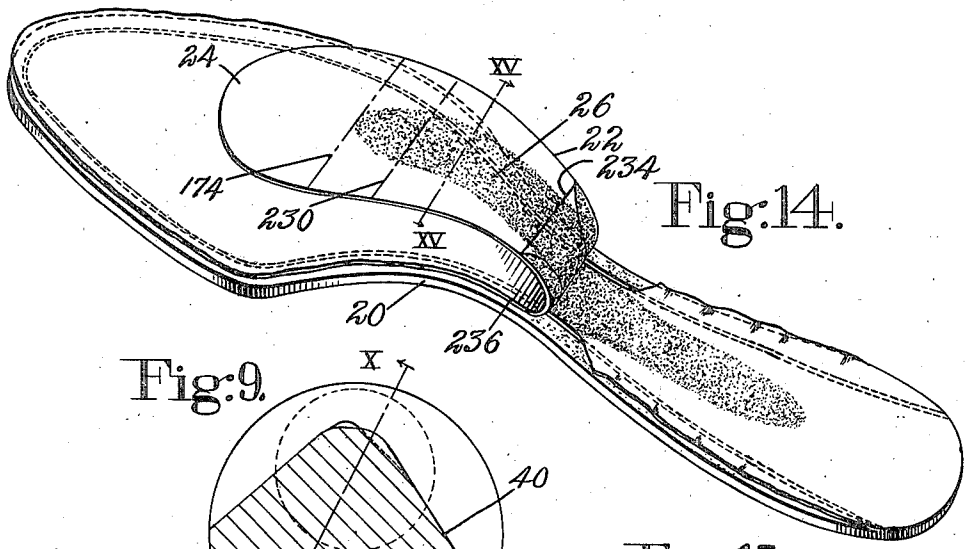


Fig:14.

Fig:9.

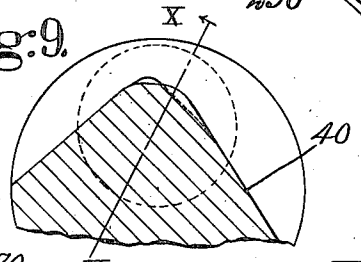


Fig:10.

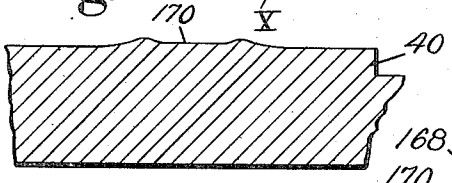


Fig:15.

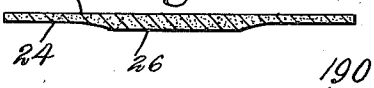
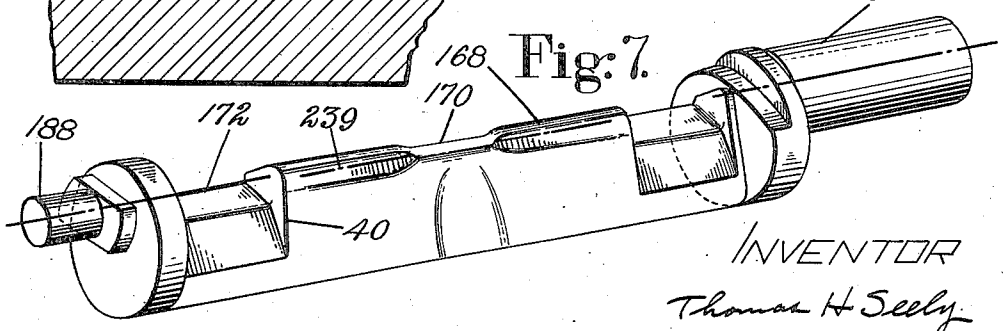


Fig:7.



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SPLITTING MACHINE

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Fig. 11.

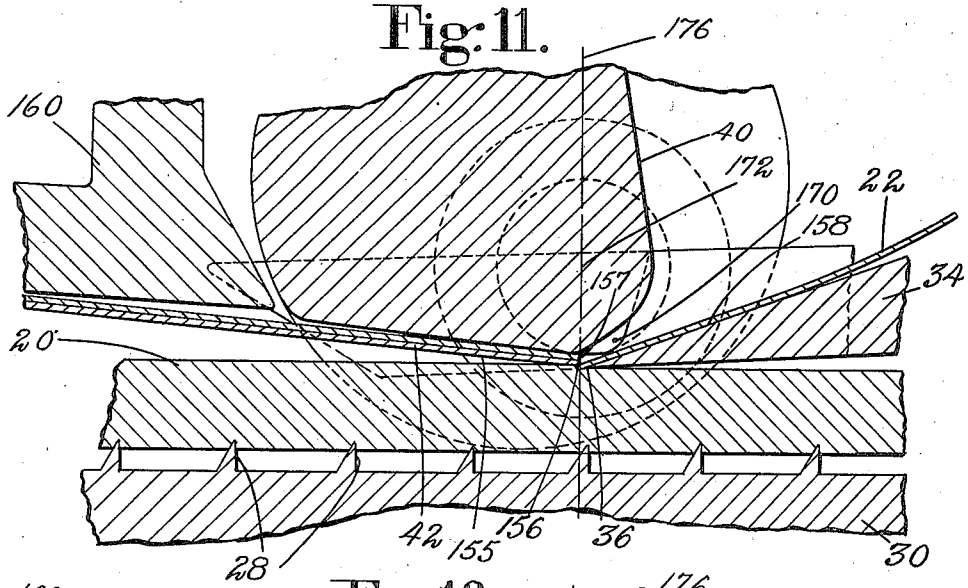


Fig. 12.

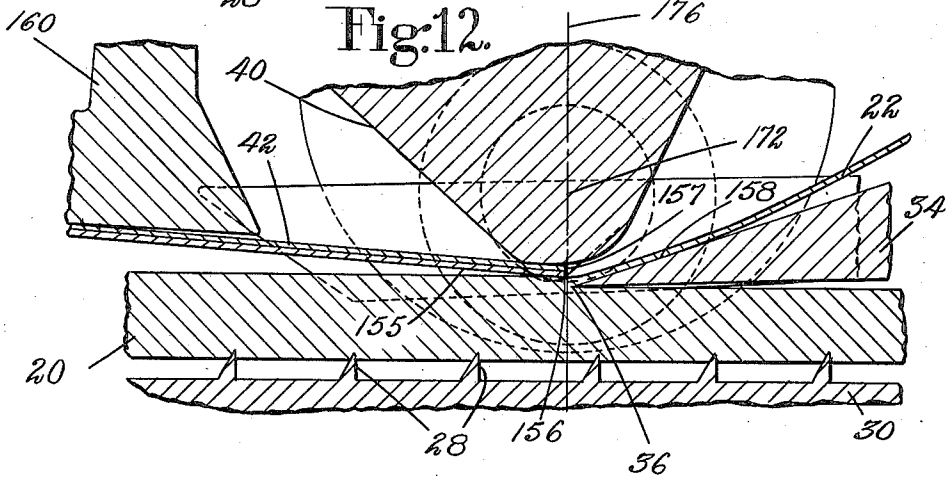
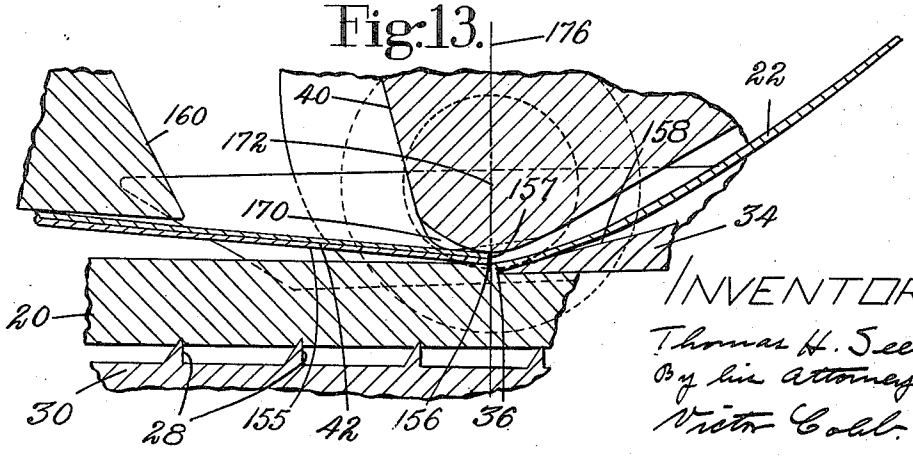


Fig. 13.



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Patented May 31, 1938 2,118,825

UNITED STATES PATENT OFFICE

2,118,825

SPLITTING MACHINE

Thomas H. Seely, Melrose, Mass., assignor to United Shoe Machinery Corporation, Paterson, N. J., a corporation of New Jersey

Application June 25, 1937, Serial No. 150,344

24 Claims. (Cl. 12—17)

This invention relates to the manufacture of shoes and is herein illustrated with reference to a machine for splitting heel-breast covering flaps from the soles of shoes.

It is an object of this invention to provide an improved machine of the general type disclosed in an application for United States Letters Patent Serial No. 9,247, filed March 4, 1935, in my name. With the above object in view, and in accordance with a feature of this invention, there is provided a support for a work piece such, for example, as a sole, a flexible member, a cutter, means for effecting relative movement of the support on the one hand and the flexible member and the cutter on the other hand to split a heel-breast covering flap from the sole, means for forcing the sole upon the support against the flexible member during said relative movement to change its shape, and means for predetermining the shape imparted to the flexible member during said relative movement in accordance with the desired shape of flap to be split from the sole. In the illustrated construction the support is a yielding bed over which the cutter and the flexible member are reciprocated, a matrix against which the flexible member is forced by contact with the sole being provided for determining the shape into which the flexible member is bent and consequently the shape of the flap produced.

In some instances it is desirable to produce a flap which varies in thickness in a particular manner in different localities. To this end, in accordance with another feature of the invention, means are provided in a machine of the kind described for progressively imparting different shapes to the flexible member and for maintaining these shapes for predetermined intervals during the formation of the flap. In the illustrated construction this is accomplished by providing the matrix with differently shaped portions which are successively rendered operative during the formation of a flap by automatically rotating the matrix into and holding it in different positions.

These and other features of the invention, including certain details of construction and combinations of parts, will be described as embodied in an illustrated machine and pointed out in the appended claims.

In the drawings,

Figs. 1 and 2 are side and plan views, respectively, partly in section and partly broken away, of the illustrated machine;

Fig. 3 is a vertical section on line III—III of Fig. 2;

Fig. 4 is an enlarged side elevation of a portion of the machine;

Fig. 5 is a section on line V—V of Fig. 3;

Fig. 6 is a perspective view of the carriage of the machine;

Fig. 7 is a perspective view of the matrix;

Fig. 8 is a perspective view of the rear central portion of the matrix shown in Fig. 7;

Fig. 9 is a section of the matrix on line IX—IX of Fig. 8;

Fig. 10 is a section of the matrix on line X—X of Fig. 9;

Figs. 11, 12 and 13 are illustrative views showing three progressive stages in the splitting of the heel-breast covering flap from the sole;

Fig. 14 shows in perspective a sole provided with a heel-breast covering flap split by the use of the above machine; and

Fig. 15 is a section of the heel-breast covering flap on line XV—XV of Fig. 14.

The illustrated machine is described with reference to splitting from the heel end of an outsole **20** (Fig. 14) a heel-breast covering flap **22** (Figs. 14 and 15) the margin **24** of which is relatively thin and of uniform thickness and the central portion of which is reenforced by a rib **26** merging with the margin. The advantages of the illustrated flap **22** are set forth in said application for United States Letters Patent disclosing a splitting machine which in many respects is similar to the present machine.

The sole **20** is positioned flesh-side down upon prongs **28** of a plate **30** comprising part of a yieldable work support **32**, and is split to provide the flap **22** by a cutter or knife **34** which has a straight cutting edge **36** and is secured to a carriage **38** movable in a rectilinear path over the work support **32** through the provision of mechanism which will be described later. A matrix **40** and a spacer member **42**, which comprises one or more flexible plates and may be referred to as a spacer plate, are secured to a bracket **44** pivoted upon a rod **46** which is eccentrically mounted in the carriage **38**, the arrangement being such that during forward movement of the carriage over the work support **32** upon which the sole is positioned, the flexible spacer member or plate **42** braced by the matrix **40** forces the sole **20** against the prongs **28**, depressing the sole to a predetermined elevation with relation to the plane of movement of the cutting edge **36** of the knife **34**, and cooperating with the prongs **28** to bend or flex the sole transversely to the desired shape progressively in ad-

vance of the knife during the forward movement or splitting stroke of the carriage.

The work support 32 is provided with slots 48 which are inclined to the path of movement of the knife 34 and are constructed to receive corresponding blocks 50 secured to the ends of rods 52 fixed to a support carrier 54 (Figs. 3 and 5). The support carrier 54 is constantly urged upward by a plurality of springs 56, the upper ends of which are in abutting relation with retaining studs 58 secured to the support carrier 54 and the lower ends of which are located in recesses 60 formed in the base 62 of the machine. Upward movement of the support carrier 54 under the action of the springs 56 is limited by the engagement of the heads 64 of screws 66 which are in threaded relation with the base 62, with the bottoms of bores 68 formed in the support carrier 54, the screws having shanks 70 which fit in openings of the support carrier. In order to insure against any binding between the support carrier 54 and the shanks 70 of screws 66, the support carrier 54 has secured to it a rod 72 which fits within an elongated channel 74 of a stud 76 secured to the base 62. When the machine is in its starting position (Fig. 3) the work support 32 is in a raised position upon the support carrier 54.

The work support 32 is moved to and is held in its raised position by a rotatable segment cam 78 which engages a cam roll 80 secured by a pin 82 to a header 84. The header 84 is adjustably secured to the work support 32 by screws 86 (Fig. 2) which are threaded into the work support and pass through elongated slots 88 of the header. When the carriage 38 reaches the forward end of its splitting stroke the segment cam 78 moves away from the cam roll 80 thereby permitting the work support 32 under the action of a spring 90 (Fig. 3) to move rearward until a stud 92 (Figs. 1 and 2) which is threaded into the header 84, engages a face 94 of the base 62. As the work support 32, mounted upon the blocks 50 of the support carrier 54, is moved rearward it is lowered thereby enabling the operator to remove the split sole from the machine during the return stroke of the carriage 38.

The spring 90 (Fig. 3) for urging the work support 32 rearward fits in a bushing 96 threaded into the header 84. The rear and front ends, respectively, of the spring 90 are in engagement with the header 84 and the head 98 of a plunger 100 which is mounted for sliding movement in the header 84 and engages the rear face of the support carrier 54. The bushing 96 and the pin 82 through which the cam roll 80 is secured to the header 84, are held in their adjusted positions in the header by set screws 102 and 104, respectively.

In order to vary the length of the flap 22 the sole-supporting plate 30 may be initially adjusted along a pair of guideways 106 (Fig. 5) of a housing 108 of the work support 32. Such adjustment is conveniently effected through the provision of a screw 110 which is in threaded engagement with the housing 108 and has a circular flange 112 (Fig. 3) fitting in a recess of a depending apron 114 secured by screws 116 to the front end of the sole-supporting plate 30.

In order to position the sole upon the plate there is provided a gage 118 which is pivotally secured to the plate by a pin 120 (Figs. 3 and 5). Sole-engaging portions 122 of the gage 118 are normally held in their raised positions above the sole-supporting plate 30 by a spring 124 the end portions of which engage within the guideways 106 of the housing 108 and the central portion of which overlies a rear extension of the gage. In order to insure that the sole-engaging abutments 122 of the gage 118 shall not be engaged by the knife 34 during movement of the carriage 38 over the work support 32, suitable mechanism which will be described later is provided for depressing the sole-engaging abutments.

The lowered position to which the work support 32 is moved with relation to the support carrier 54 under the action of the spring 90 when the segment arm 78 is moved away from the cam roll 80, may be varied by setting the stud 92 (Figs. 1 and 2) in different adjusted positions in the header 84. In order to vary the height of the work support 32 when the machine is idle (Fig. 3) the header 84 may be adjusted forward or rearward with relation to the work support through the provision of the screws 86 (Fig. 2) which, as above stated, are threaded into the work support 32 and pass through elongated slots 88 of the header 84. To insure against movement of the header 84 with relation to the work support 32 there is provided a set screw 126 (Fig. 2) the forward end of which is in threaded relation with the work support and the rear end of which is in abutting relation with the header 84. The carriage 38 is moved over the work support 32 upon ways 128 (Fig. 5) of the base 62 through the provision of a connecting rod 130 (Figs. 1, 2 and 3) which is secured to the carriage by a bearing pin 132, the rear end of the rod 130 being pivotally secured to a crank pin 134 (Fig. 1) which is movable with the segment cam 78 and may be initially adjusted with relation to said cam.

The machine rotates continuously while a treadle (not shown) connected to a cable 136 (Fig. 1) is held depressed. The machine, however, stops after it has completed one cycle if the treadle is released immediately after the machine is started. The segment cam 78, the connecting rod 130, and the mechanism for operating the same are identical with corresponding mechanism disclosed in said application for United States Letters Patent and need not be further described herein.

The knife 34 is secured to the carriage 38 by bolts 138 (Fig. 3) which pass through slots 140 (Fig. 2) of the carriage and carry nuts 142. The knife 34 may be quickly and accurately positioned in the machine after it has been sharpened by providing the carriage 38 with shoulders 144 (Fig. 6) which are engaged by end portions of the knife when it is in its proper position in the carriage. After the knife has been positioned in the carriage 38 the nuts 142 are set up to secure the knife to the carriage.

Secured by screws 146 to the carriage 38 and located in advance and at opposite sides of the knife 34 are a pair of plows 148 (Fig. 6) for depressing the sole-engaging portions 122 of the gage 118 below the plane of movement of the cutting edge 36 of the knife 34 during the splitting operation thereby insuring that the knife shall not strike the gage.

The bracket 44 for supporting the matrix 40 and the spacer member 42 is pivotally mounted upon the rod 46 which is eccentrically mounted in bearings 150 secured to the carriage 38. As above stated, when the machine is idle (Fig. 3) the work support 32 is in its raised position, the segment cam 78 having forced the work sup-

port forward against the action of the spring-pressed plunger 100.

As the carriage 38, operated by the connecting rod 130, is moved along the ways 128 (Fig. 5) the rear margin of the spacer member 42 braced by the matrix 40, is forced against the sole positioned upon the work support 32 and swings upon the rod 46 together with the matrix, toward the knife 34 and the work support 32, forcing the sole against the prongs 28, and depressing the work support 32 against the action of the springs 56. Rearward swinging movement of the bracket 44 toward the knife 34 is limited by the engagement of a shoulder 152 (Figs. 1 and 2) of the bracket 44 with an opposed shoulder 154 of the carriage 38.

It will be noted that when the spacer member 42 has been swung about the rod 46 into its rear operative position (Figs. 11, 12 and 13) the cutting edge 36 of the knife 34 is positioned adjacent to a gaging edge 156 formed by the intersection of the lower face 155 and the end face 157 of the spacer member. The gaging edge 156 forms with the cutting edge 36 of the cutter an opening through which the split flap passes as the carriage 38 is moved forward over the work support 32. When the bracket 44 has been swung into its rear position the opening formed between the matrix 40 and the beveled face 158 of the knife is wider than the opening formed between the gaging edge 156 of the spacer member 42 and the cutting edge 36 of the knife 34. Spacer members 42 of different thicknesses may be used, the desirable arrangement being such that the opening formed between the matrix 40 and the beveled face 158 of the knife 34 shall be of sufficient width to insure the free passage of the split flap between the matrix and the knife. Although the carriage 38 of the illustrated machine is movable over the work support 32 applicant contemplates a construction in which the carriage is held stationary and the work support is moved past the carriage to split the flap from the sole. The yieldable work support 32 may be referred to as a presser member since it forces the sole against the spacer member 42 as the carriage 38 is moved over the work support thereby forcing the spacer member against the matrix 40 and causing the spacer member and the work to be conformed to the shape of the matrix.

The spacer member 42 is secured at its forward end to a plate support 160 of the bracket 44 by studs 162 which pass through holes formed in the spacer member and through elongated slots 161 (Fig. 2) of the plate support 160. The spacer member 42 is forced against the plate support 160 by springs 164 which surround the upper ends of the respective studs and the opposite ends of which engage respectively the plate support and washers 166 mounted upon the studs and held in place by cotter pins 167.

The matrix 40 has the form of a drag bar (Fig. 7) which is wedge shaped in cross section and comprises a sharply curved surface 168 including a recess 170 of non-uniform width. During the first part of the forward movement of the carriage 38 from its starting position (Fig. 3) the rear margin of the spacer member 42 is forced under pressure of the sole upon the work support 32 against the face 168 of the matrix 40, the matrix and the spacer member swinging under pressure of the sole about the rod 46 to their rear operative positions in the carriage 38. In forming the flap 22 which is provided with the reenforcing rib 26 (Fig. 14), the matrix 40 is rotated into different adjusted positions about an axis 172 during the forward movement or splitting stroke of the carriage 38, the arrangement being such that different portions of the face 168 and the recess 170 of the matrix are engaged by the spacer member 42 during different portions of the splitting stroke of the carriage. As above stated, during the splitting operation the prongs 28 of the work support 32 penetrate the sole and secure the same against movement, as well as cooperate with the spacer member 42 to flex the sole transversely and progressively in advance of the knife in accordance with the shape of the operating portion of the matrix 40 engaged by the spacer member.

The major portion of the face 168 of the matrix 40 is cylindrical, the elements of the face being arranged in parallel relation to the cutting edge 36 of the knife 34. When the spacer member 42 is in its rear operative position (Fig. 13) its lower face 155 is inclined slightly to the path of movement of the cutting edge 36 of the knife 34, the gaging edge 156 of the spacer member 42 being located adjacent to the cutting edge of the knife and the width of the opening between the gaging edge 156 and the cutting edge 36 being approximately equal to the thickness of the flap to be split from the sole. The cylindrical portion of the face 168 (Fig. 7) of the matrix 40, but not the recess 170, is engaged by the spacer member 42 during the first part of the forward movement (Fig. 11) of the carriage 38 and until the flap has been split forward to line 174 (Fig. 14). When the end portion of the flap is being split the portion of the matrix 40 indicated by line 175 (Fig. 8) is engaged by the spacer plate 42. As the carriage 38 continues to move forward the matrix 40 is turned about its axis 172, causing a portion of the recess 170, as well as the portions of the cylindrical face 168 located at opposite sides of said portion of the recess, to be engaged by the spacer member 42 thereby providing the flap 22 having the reenforcing rib 26 and the margins of uniform thickness at opposite sides of the rib.

As above stated, the width of the opening between the matrix 40 and the beveled face 158 (Figs. 11, 12 and 13) of the knife 34 is considerably greater than the width of the opening between the gaging edge 156 of the spacer member 42 and the cutting edge 36 of the knife 34 thereby insuring that the flap shall pass freely between the knife and the matrix. By interposing the flexible spacer member 42 between the matrix 40 and the cutting edge 36 of the knife 34 it is possible to position the cutting edge 36 of the knife approximately in the plane 176 (Figs. 11 to 13) in which pressure is applied against opposite sides of the sole.

At the beginning of the return stroke of the carriage 38 the spacer member 42 and the matrix 40, which are mounted upon the bracket 44, swing away from the knife 34 under pressure of the sole. In order to permit the operator to remove the sole from the machine immediately after it has been split without the likelihood of tearing the flap, the bracket 44 is forced to its forward position (Fig. 3) away from the knife 34 by a spring 178 (Figs. 1 and 2) during the first part of the return stroke of the carriage 38. The front end of the spring 178 is secured to the carriage 38 and the rear end of the spring is secured to a pin 180 which passes through a bore in the carriage and engages the shoulder 152 of the bracket

44. Forward swinging movement of the bracket 44 about the rod 46 is limited by a bar 182 the rear end of which is pivotally secured to the carriage 38 and the front end of which has a hook-shaped portion 184 engaged by a pin 186 secured to the bracket 44.

The matrix 40 is pivoted upon trunnions 188 and 190 (Fig. 7). The trunnion 190 fits in a bearing 192 (Fig. 6) and the trunnion 188 is rotatably mounted in a bushing (not shown) which fits in a bearing 194 and is keyed to an arm 196. It will be noted that the axis 172 of rotation of the matrix 40 is located near the portion of the face 168 of the matrix engaged by the spaced member 42. The bearings 192 and 194 are secured respectively in sockets 198 by screws 200.

In order to vary the thickness of the flap the operative positions of the spacer member 42 and the matrix 40 may be varied with relation to the knife 34 by swinging the eccentrically mounted rod 46 into different adjusted positions in the carriage 38. The rod 46 may be quickly and accurately adjusted by releasing a set screw 202 and then raising or lowering the free end of a pin 204 which is in threaded relation with the rod. The plate support 160 is provided with a slot 205 (Fig. 6) for receiving a forwardly projecting rib 207 of a lug 209 constituting part of the bracket 44. A thrust screw 210 is threaded into the lug 209 and normally has its head in engagement with a shoulder of the plate support 160. The plate support 160 may be raised or lowered into different adjusted positions with relation to the matrix 40 through the provision of the thrust screw 210 and screws 206 which are threaded into the lug 209 and pass through elongated slots 208 of the plate support 160.

The mechanism for rotating the matrix 40 into different operative positions as the carrier 38 is moved forward to split the sole will now be described. The arm 196 (Figs. 2, 4 and 6) which is operatively connected to the matrix 40 is pivotally connected through a link 212 to a lever 214 mounted for rotation upon a pin 216 secured to the carriage 38. A plunger 218 is secured within a recess at the lower end of the lever 214. Rotatably secured to the inner end of the plunger 218 is a cam roll 220 which may be arranged for engagement with cams 222 (Figs. 2 and 4) and 224 during the forward movement of the carriage 38. The cams 222 and 224 are practically identical with corresponding cams illustrated in the machine disclosed in the above-mentioned application for United States Letters Patent Serial No. 9,247.

During the first part of the forward movement of the carriage 38 the cam roll 220, positioned as illustrated in Fig. 6 of the drawings, engages the plane face 226 (Fig. 4) of the cam 222 causing the matrix 40 to be moved into the position illustrated in Fig. 11 and so held during the splitting of the portion of the flap 22 (Fig. 14) included between the end of the flap and line 174, as above described. As the carriage 38 continues to travel forward the roll 220 moves up the curved portion 228 (Fig. 4) of the cam 222 causing the matrix 40 to be rotated to the position illustrated in Fig. 12 as the portion of the flap 22 included between line 174 and line 230 is split, said portion being commonly called the bullet part of the rib 26. The cam roll 220 then moves along the plane face 232 (Fig. 4) of the cam 222 as the carriage 38 continues to move forward, thus retaining the matrix 40 in the angular position illustrated in Fig. 12 during the splitting of the portion of the flap which is included between lines 230 and the heel-breast line 234, said portion including what is commonly referred to as the cartridge part of the rib 26. When the roll 220 is in engagement with the plane face 232 (Fig. 4) of the cam 222 the portion of the matrix 40 indicated by line 235 (Fig. 8) is engaged by the spacer plate 42.

It is common practice to increase the thickness of the margins of the flap 26 forward of its heel-breast line 234 (Fig. 14) in order that the flap shall merge with the previously formed channel flap 236. Accordingly the illustrated machine is provided with the cam 224 (Fig. 4) having an operative face 238. When the face 238 of the cam 224 is engaged by the cam roll 220 during the forward movement of the carriage 38 the matrix 40 is in the position illustrated in Fig. 13 to form the forward end portion of the flap which is later cemented to the shank portion of the sole of the shoe. It will be noted when the matrix 40 is in the position shown in Fig. 13 the portion of the matrix indicated by line 239 (Fig. 7) is engaged by the spacer plate 42.

The plunger 218 is selectively located and retained in three different operating positions in the lever 214 (Fig. 6) through the provision of a spring-pressed detent 240 shaped and arranged to fit in circular grooves 242, 244 and 246 of the plunger. When the detent 240 is in engagement with the groove 246 of the plunger 218, the cam roll 220 engages cams 222 and 224 during the forward movement of the carriage to form the flap 22. When the detent 240 is in engagement with the groove 244 of the plunger 218 the cam roll 220 engages the cam 222 but not the cam 224 during the forward movement of the carriage 38, the resulting flap being provided with a rib the cartridge part of which extends to the base of the flap. When the detent 240 is in engagement with the groove 242 of the plunger 218, the cam roll 220 does not engage either of the cams 222, 224 during its forward movement, the lever 214 being retained in its starting position during the forward movement of the carriage 38 with the result that the flap split from the sole is of uniform thickness throughout its extent.

In splitting the flap 22 (Fig. 14) from the sole a spring-pressed detent 248 (Fig. 2) carried by the lever 214 enters a recess 250 (Fig. 4) formed in the carriage 38 as the cam roll 220 is moved into engagement with the face 238 of the cam 224. During the return stroke of the carriage 38 the matrix 40 is held against rotation in the bracket 44 through the provision of the spring-pressed detent 248 until a lug 252 adjustably secured to the lower end of the lever 214 engages an abutment 254 of the base 62 and causes the detent 248 to be withdrawn from the recess 250 and the matrix 40 to be rotated back to its starting position.

When the lever 214 has been swung back to its starting position in the carriage 38 the detent 248 moves into a recess 256 (Fig. 2) formed in the carriage 38. In splitting flaps which are of uniform thickness throughout their extent the lever 214 is held stationary with relation to the carriage 38 during the forward and rearward strokes of the carriage by the engagement of the detent 248 in the recess 256. The carriage is also provided with another recess 258 arranged to receive the detent 248 when the cam roll 220 is in engagement with the surface 232 of the cam 222.

The length of the reenforcing rib 26 (Fig. 14) of the flap 22 may be varied by adjusting the cam 222 forward or rearward with relation to the work support 32, such adjustment being quickly effected by causing one of a plurality of notches 260 (Fig. 2) formed in the forward end of the cam 222, which is supported at its forward end by a leaf spring 262, to be engaged by a pin 264 carried by the apron 214 which is secured to the forward end of the work-supporting plate 30.

In order to split heel-breast covering flaps from the soles of shoes the operator places the sole flesh-side down upon the prongs 28 of the yieldable work support 32, the rear end of the sole being in engagement with the sole-engaging portions 122 of the gage 118. The operator then depresses the treadle (not shown) causing the carriage 38 to move forward over the sole upon the ways 128 (Fig. 5). As the flexible member or plate 42 is forced against the heel end of the sole it is swung, together with the matrix 40, about the rod 46, until the shoulder 152 (Figs. 1 and 2) of the bracket 44 has engaged the shoulder 154 of the carriage 38, during which movement the spacer member 42 overrides the sole, presses the sole upon the prongs 28, and depresses the work support 32, thereby positioning the sole heightwise with relation to the path of movement of the cutting edge of the knife 34 secured to the carriage 38. Upon continued forward movement of the carriage 38 the rear margin of the spacer member 42, forced upward by the sole, conforms to the shape of the matrix 40 which is rotated into different angular positions through the provision of the above-described mechanism and which, in combination with the spacer member 42 and the prongs 28 of the plate 30, causes the sole to be flexed progressively in advance of the knife 34 as the carriage moves forward to split the sole. During the first part of the return stroke of the carriage 38 the spacer member 42 and the matrix 40 are swung away from the knife 34 and the work support 32 is moved rearward and downward under the action of the spring 90 until the stud 92 (Figs. 1 and 2) engages the face 94 of the base 62 of the machine, thereby enabling the operator to remove the split sole from the machine during the return stroke of the carriage 38. As the carriage 38 reaches the end of its return stroke the segment cam 78 engages the roll 80 causing the work support 32 to be forced forward and therefore raising the work support to its elevated starting position (Fig. 3) upon the support carrier 54.

Although the illustrated machine has been described with reference to splitting heel-breast covering flaps from the soles of shoes, it will be understood that the above machine may be used for splitting various types of work pieces.

Claims directed to a splitting machine provided with a flexible spacer member which is conformable to a matrix under pressure of a work piece, are included in an application for United States Letters Patent Serial No. 150,355, filed June 25, 1937 in the name of Lewis J. Bazzoni.

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

1. A splitting machine having, in combination, a support for a work piece, a flexible member, a cutter, means for effecting relative movement of the support on the one hand and the flexible member and the cutter on the other hand to split a flap from said work piece, means for forcing the work piece upon the support against the flexible member during said relative movement, and means for controlling the shape of the flexible member during said relative movement in accordance with the desired shape of the flap to be split from the work piece.

2. A splitting machine having, in combination, a support for a work piece, a matrix, a flexible member interposed between the support and the matrix, a knife, and means for effecting relative movement of the support on the one hand and the flexible member, the knife and the matrix on the other hand to split a flap from said work piece, said flexible member and said matrix being mounted for movement with relation to the knife under pressure of the work piece upon the support preparatory to splitting the work piece, and said flexible member being constructed and arranged to engage and to conform to said matrix under pressure of the work piece during said relative movement.

3. A splitting machine having, in combination, a support for a work piece, a matrix, a flexible member which is interposed between the matrix and the support, a knife, means for effecting relative movement of the support on the one hand and the flexible member, the knife and the matrix on the other hand to split a flap from said work piece, said flexible member having a margin constructed and arranged to engage the work piece during said relative movement, said matrix being constructed and arranged to support said margin of the flexible member against the pressure of the work piece during said relative movement, and means for moving the matrix into different adjusted positions with relation to the knife and the flexible member during said relative movement thereby causing different shaped portions of the matrix to be engaged by the flexible member as the flap is split from the work piece.

4. A splitting machine having, in combination, a support comprising a plurality of sharp prongs upon which a work piece is positioned, a knife, a matrix, a flexible member interposed between the support and the matrix, means for relatively moving the support on the one hand and the knife, the matrix and the flexible member on the other hand to split a flap from the work piece, and means for forcing the work piece upon the support against the flexible member during said relative movement, said matrix being constructed and arranged to support the flexible member against the action of the work piece, and said flexible member and said matrix being movable together with relation to the knife during a portion of said relative movement.

5. A splitting machine having, in combination, a support for a work piece, a knife, mechanism for effecting relative movement of the support and the knife to split the work piece, and means cooperating with the support for gripping the work piece progressively in advance of the knife during said relative movement, said means comprising a flexible member having an edge which is positioned adjacent to the edge of the knife, and a matrix against which the flexible member is forced under pressure of the work piece to cause its edge to be flexed in accordance with the shape of the matrix.

6. A splitting machine having, in combination, a support comprising a plurality of sharp prongs upon which a work piece is positioned, a knife, a matrix, a flexible member interposed between the support and the matrix, means for relatively moving the support on the one hand and the

knife, the matrix and the flexible member on the other hand to split a flap from the work piece, means for forcing the work piece mounted upon the support against the flexible member during said relative movement, said matrix being constructed and arranged to support the flexible member against the pressure exerted by the work piece, said flexible member and said matrix being movable together with relation to the knife during a portion of said relative movement, and means for moving the matrix with relation to the knife and the flexible member during the splitting of the flap from the work piece to cause different portions of the matrix to be engaged by said member.

7. A splitting machine having, in combination, a support comprising a plurality of sharp prongs arranged to be engaged by a work piece, a knife, a matrix positioned adjacent to but spaced from the cutting edge of the knife, a flexible plate having a margin positioned adjacent to said cutting edge and interposed between the matrix and the support, and means for moving the matrix, the flexible plate and the knife in predetermined paths with relation to the support to split a flap from the work piece, said flexible plate being constructed and arranged to force the work piece against said prongs and to be conformed to the shape of the matrix under pressure of the work piece during its movement in said path.

8. A splitting machine having, in combination, a support comprising a plurality of sharp prongs constructed and arranged to be engaged by a work piece, a knife, a matrix having a face provided with a recess, said face being positioned adjacent to but spaced from said cutting edge, a flexible plate having a margin which is positioned adjacent to but is spaced from said cutting edge and is interposed between the matrix and the support, means for moving the matrix, the flexible plate and the knife over the support to split a flap from the work piece, said flexible plate being constructed and arranged to force the work piece against the prongs and to be conformed to and supported by the matrix under pressure of the work piece as it is moved over the support, and means for moving the matrix into different adjusted positions with relation to the flexible plate as the plate and the matrix are moved over the support thereby causing different portions of said matrix to be engaged by the plate as the flap is split from the work piece.

9. A splitting machine having, in combination, a suport comprising a plurality of sharp prongs constructed and arranged to be engaged by a work piece, a knife, a matrix spaced from the knife, a flexible plate having a gaging edge which is spaced from the cutting edge of the knife and is interposed between the matrix and the support, means for moving the matrix, the flexible plate and the knife over the support to split a flap from the work piece, said flexible plate being constructed and arranged to force the work piece against said prongs of the support and to be conformed to and supported by the matrix as the plate and the matrix are moved over the support, the opening between the matrix and the knife being wider than the opening between said gaging edge of the flexible plate and the cutting edge of the knife, and means for moving the matrix into different adjusted positions as it is moved over the support thereby varying the shape of the flexible plate and the work piece in accordance with the shape of the matrix as the flap is split from the work piece.

10. A splitting machine having, in combination, a yieldable support comprising a plurality of sharp prongs arranged to be engaged by a work piece, means for positioning the work piece upon the support, a carriage movable in a predetermined path with relation to the support, means for initially adjusting the support lengthwise of the path of movement of the carriage, a knife rigidly secured to the carriage, a matrix movable with the carriage, and a flexible spacer member movable with the carriage and having a margin arranged to be forced against the matrix under the pressure of the work piece upon the support when the carriage is moved in said path, said spacer member being provided with an end face which is positioned between the cutting edge of the knife and the portion of the matrix engaged by the spacer member.

11. A splitting machine having, in combination, a yieldable support for a work piece, a carriage movable over the support in a predetermined path, a knife rigidly secured to the carriage, a bracket pivotally secured to the carriage, a matrix pivotally secured to the bracket, a flexible spacer member secured to the bracket and having a margin which is interposed between the cutting edge of the knife and the matrix and which is forced against the matrix under pressure of the work piece when the carriage is moved over the support, and means for swinging the matrix into different adjusted positions during the movement of the carriage over the support.

12. A splitting machine having, in combination, a yieldable support for a work piece, a carriage movable over the support in a predetermined path, a knife rigidly secured to the carriage, a bracket pivotally secured to the carriage, a matrix rotatably secured to the bracket, a flexible spacer plate inclined at a slight angle to the path of movement of the carriage, the forward margin of said spacer plate being secured to the bracket and the rear margin of said plate being interposed between the cutting edge of the knife and the matrix, and being constructed and arranged to be forced against the matrix under pressure of the work piece when the bracket is swung to its rear position in the carriage, and means for rotating the matrix into different adjusted positions during the forward movement of the carriage in said path.

13. A splitting machine having, in combination, a yieldable support for a work piece, a knife, a matrix, a flexible spacer plate positioned between the matrix and the support, said matrix and said spacer member being mounted for movement toward and away from the cutting edge of the knife, means for moving the knife, the matrix and the spacer plate in one direction over the support to split a flap from the work piece, means for limiting the movement of the matrix and the spacer plate toward the cutting edge of the knife during the movement of the matrix and the spacer plate in said one direction, a stop, and means for urging the matrix and the spacer plate away from the cutting edge of the knife until such movement is limited by said stop during the movement of the knife, the matrix and the spacer plate in an opposite direction over the support.

14. A splitting machine having, in combination, a yieldable support for a sole, a knife, means for effecting relative movement of the support and the knife lengthwise of the sole to split a heel-breast covering flap from the same, a flexible

member for forcing the sole progressively against the support immediately in advance of the cutting edge of the knife during said relative movement of the support and the knife, and a matrix constructed and arranged to support the flexible member against the reaction of the sole and to cause the flexible member and the sole to be conformed to a predetermined shape, said flexible member having an end face which is spaced from and extends lengthwise of said cutting edge and which during the splitting of the flap from the sole is positioned between the cutting edge of the knife and the portion of the matrix engaged by said flexible member.

15. A splitting machine having, in combination, a yieldable support provided with a plurality of sharp prongs arranged to be engaged by a sole, a knife, a flexible plate, a matrix, and means for moving the knife, the matrix and the flexible plate over the support to split a heel-breast covering flap from the sole, said plate during such movement being pressed by the sole against the matrix and being moved with the matrix toward the support into operative position thereby forcing the sole against the prongs and moving it into a predetermined position with respect to the edge of the knife.

16. A splitting machine having, in combination, a yieldable support comprising a plurality of sharp prongs arranged to be engaged by a sole, a knife, a matrix bar having a sharply curved face including a recess, a flexible member, means for effecting relative movement of the support on the one hand and the knife, the matrix bar and the flexible member on the other hand to split a heel-breast covering flap from the sole, said flexible member having a margin which is constructed and arranged to engage said face of the matrix bar under pressure of the sole upon the support during said relative movement, and means for causing different portions of said face of the matrix bar to be engaged by the flexible member during different portions of said relative movement and for causing said flexible member in cooperation with said prongs to bend the sole transversely and progressively in advance of the knife as the flap is split from the sole.

17. A splitting machine having, in combination, a yieldable support provided with a plurality of sharp prongs arranged to be engaged by a sole, a knife movable over the support and having a straight cutting edge, a drag bar movable over the support with the knife and positioned in advance of the cutting edge of the knife, and a flexible member which is movable over the support with the knife and the drag bar and is positioned in front of the cutting edge of the knife between the support and the drag bar, said flexible member and said drag bar being mounted for swinging movement with relation to the knife during their movement over the support with the knife to enable the flexible member, which is forced against the drag bar by the sole, to override the heel end of the sole and then to force the sole against said prongs of the support with sufficient pressure to depress the support, said flexible member and said support being constructed and arranged to flex the sole progressively in advance of the cutting edge of the knife during the splitting movement of said knife.

18. A splitting machine having, in combination, a yieldable support provided with a plurality of sharp prongs arranged to be engaged by a sole, a knife movable over the support in a rectilinear path and having a straight cutting edge, a drag bar movable over the support with the knife and positioned in advance of the cutting edge of the knife, a flexible plate which is positioned between the drag bar and the support and which is inclined to the path of movement of the knife and is movable over the support with the knife and the drag bar, said flexible plate and said drag bar being mounted for swinging movement with relation to the knife during their movement over the support to enable the flexible plate which is forced against the drag bar by the sole to override the heel end of the sole and then to force the sole against said prongs of the support with sufficient pressure to depress the support, said flexible plate and said support being constructed and arranged to flex the sole progressively in advance of the cutting edge of the knife during its movement over the support, and means for moving the drag bar into different angular positions as it is moved over the support.

19. A splitting machine having, in combination, a support for a work piece, a knife, mechanism for moving the knife over the support to split a flap from the work piece, and means movable with the knife and constructed and arranged in combination with the support to grip the work piece progressively in advance of the knife during the movement of the knife over the support, said means comprising a flexible member having an end face an edge of which is positioned adjacent to the cutting edge of the knife and a matrix against which the flexible member is forced under pressure of the work piece and which is spaced a predetermined distance from said edge of the flexible plate during the splitting of the flap from the sole.

20. A splitting machine having, in combination, a support for a work piece, a knife, mechanism for moving the knife over the support in a fixed path to split a flap from the work piece, means movable with the knife and constructed and arranged in combination with the support to grip the work piece progressively in advance of the knife during movement of the knife over the support, said means comprising a flexible plate inclined to the path of movement of the cutting edge of the knife and having an edge which forms with the cutting edge of the knife an opening of predetermined width, and a matrix against which the flexible plate is forced under pressure of the work piece and which is spaced by the plate from said edge of the plate during the splitting of the flap from the sole.

21. A splitting machine having, in combination, a support comprising a plurality of sharp prongs arranged to be engaged by a work piece, a knife, mechanism for moving the knife over the support in a predetermined path to split a flap from the work piece, means movable with the knife and constructed and arranged in combination with the support to grip the work piece progressively in advance of the knife during the splitting stroke of the knife over the support, said means comprising a matrix and a flexible plate which is inclined to the path of movement of the knife and which is positioned adjacent to the cutting edge of the knife and is forced against the matrix under pressure of the work piece during the splitting stroke of the knife, and means for moving the matrix into different adjusted positions with relation to the plate during said splitting stroke of the knife.

22. A splitting machine having, in combination, a yieldable support for a work piece, a carriage mounted for reciprocation over the support in a

predetermined path, a knife rigidly secured to the carriage, a bracket pivotally secured to the carriage, a matrix mounted for rotation in the bracket, a flexible spacer member secured to the bracket and having a margin which is interposed between the cutting edge of the knife and the matrix and is forced against the matrix under pressure of the work piece during movement of the carriage in one direction in said path, means for rotating the matrix into different adjusted positions in the bracket during movement of the carriage in said one direction, and means for securing the matrix against movement in the bracket during movement of the carriage in an opposite direction in said path.

23. A splitting machine having, in combination, a yieldable support for a work piece, a carriage mounted for reciprocation over the support in a predetermined path, a knife rigidly secured to the carriage, a bracket pivotally secured to the carriage, a matrix pivotally secured to the bracket, a flexible spacer member secured to the bracket and having a margin which is interposed between the cutting edge of the knife and the matrix and is forced against the matrix under pressure of the work piece during the movement of the carriage in one direction in said path, means for rotating the matrix into different adjusted positions during movement of the carriage in said one direction, means for moving the support away from the carriage after the carriage has completed its movement in said one direction, and means for swinging the matrix and the spacer member away from the cutting edge of the knife during the movement of the carriage in an opposite direction in said path.

24. A splitting machine having, in combination, a yieldable support comprising a plurality of sharp prongs arranged to be engaged by a work piece, a carriage mounted for reciprocation over the support in a predetermined path, a knife rigidly secured to the carriage, a bracket pivotally secured to the carriage, a matrix rotatably mounted in the bracket, a flexible spacer plate secured to the bracket and having a margin which is interposed between the cutting edge of the knife and the matrix and which is forced against the matrix under pressure of the work piece during the movement of the carriage in one direction in said path, a plurality of cams, mechanism comprising a cam roll mounted upon the carriage and constructed and arranged to be operated by one or more of said cams and to rotate the matrix into different adjusted positions during the movement of the carriage in said one direction, and means for moving the cam roll into different adjusted positions with relation to said mechanism to cause said cam roll to engage one or more of said cams.

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