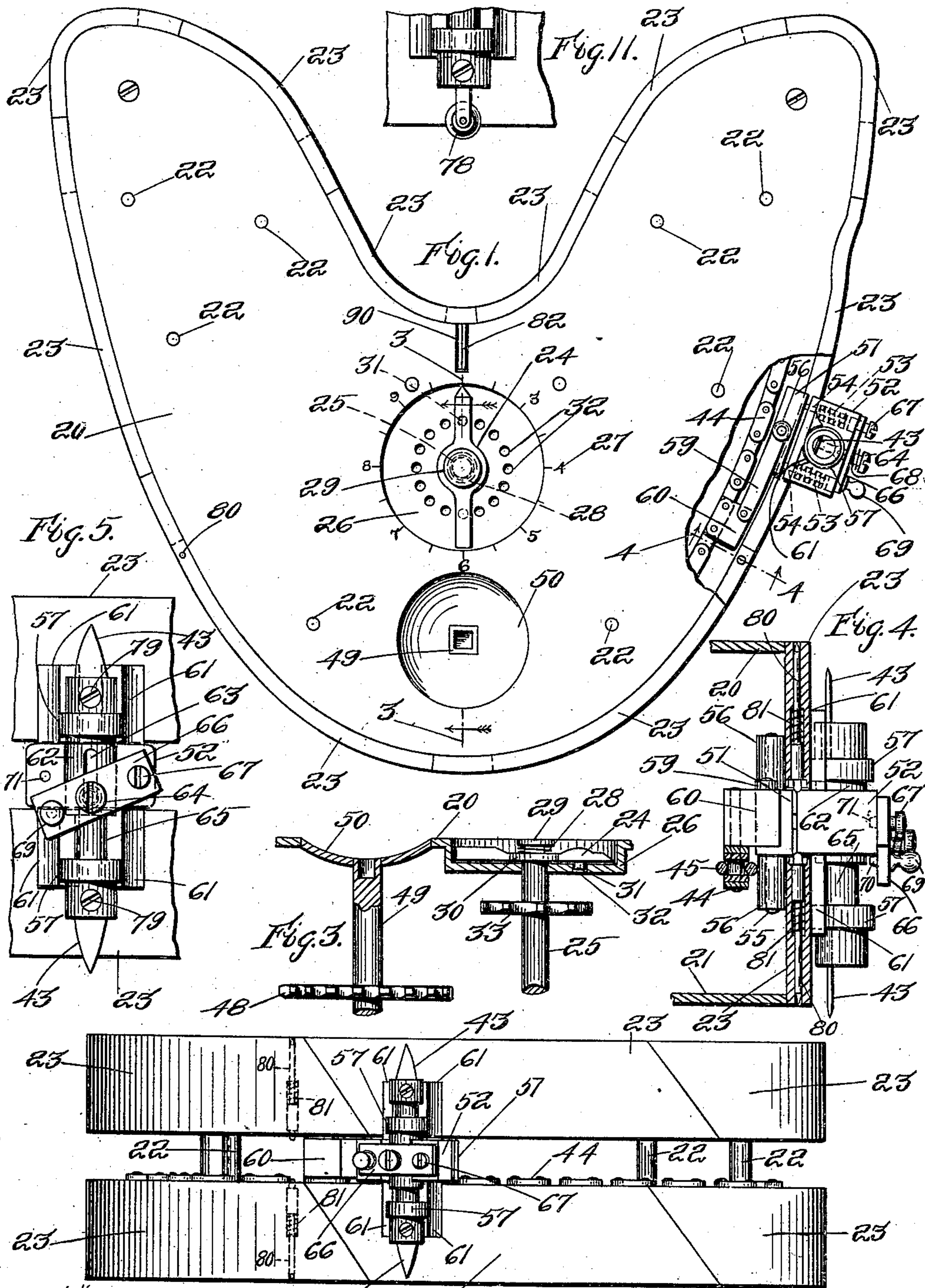


E. R. SHAW.
MACHINE FOR CUTTING BOOTS AND SHOES.
APPLICATION FILED APR. 3, 1909.

967,577.

Patented Aug. 16, 1910.

2 SHEETS—SHEET 1.

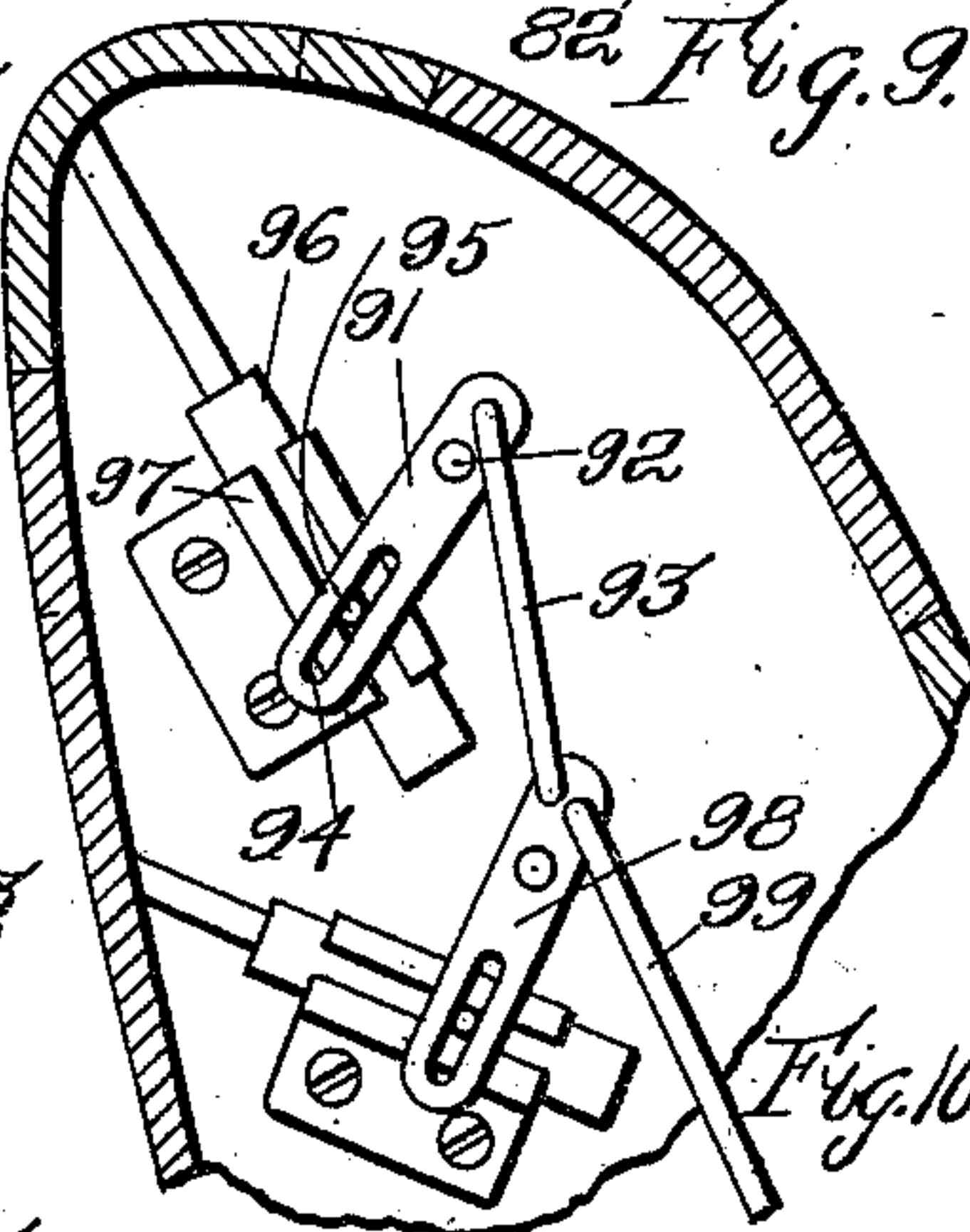
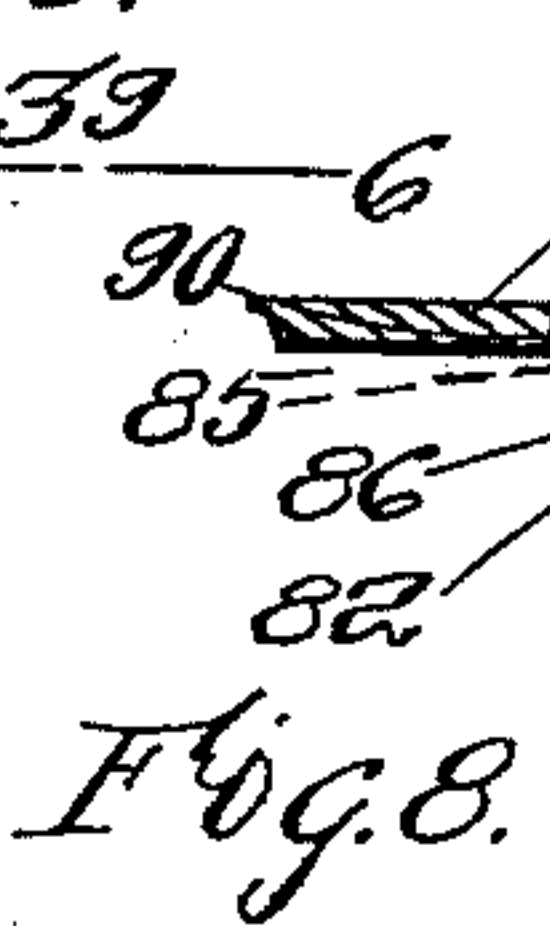
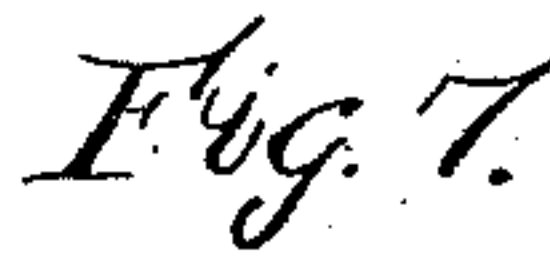


Witnesses:
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Fig. 2. Invention:
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967,577.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

EDWARD R. SHAW, OF LYNN, MASSACHUSETTS.

MACHINE FOR CUTTING BOOTS AND SHOES.

967,577.

Specification of Letters Patent.

Patented Aug. 16, 1910.

Application filed April 3, 1909. Serial No. 487,761.

To all whom it may concern:

Be it known that I, EDWARD R. SHAW, citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented a certain new and useful Improvement in Machines for Cutting Boots and Shoes, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention has for its object a new and improved device for use in cutting leather and similar material into pieces of regular or irregular shape and is adapted particularly for use in connection with the manufacture of boots and shoes, gloves, pocket books and like articles.

My present invention is an improvement on the machine shown in my Patent No. 815,643, dated March 20, 1906, and relates particularly to the means by which the change in size is effected and also to the construction and operation of the device by means of which the cutting is effected.

In the accompanying drawings, I have illustrated my invention as embodied in a machine intended for cutting the vamps of boots and shoes, but it is obvious that it may be readily embodied in machines for cutting many other regular or irregular shapes.

The vamp cutter has been chosen as an embodiment of my present invention because the vamp contains what may be termed a re-entrant angle and, therefore, illustrates the means employed for overcoming the difficulties in connection with a piece of irregular shape having a re-entrant angle.

The invention will be fully understood from the following description taken in connection with the accompanying drawings, and the novel features will be pointed out and clearly defined in the claims at the close of the specification.

In the drawings,—Figure 1 is a top plan view of a device embodying my invention. Fig. 2 is an elevation of the right hand side of the device shown in Fig. 1 with the knife-holder in mid position. Fig. 3 is a section on line 3—3, Fig. 1, looking in the direction of the arrows. Fig. 4 is a section on line 4—4, Fig. 1, looking in the direction of the arrows, and showing the knife and knife-holder in operative position. In this view it has been assumed that the edge of the pattern is straight from the point where the section is taken to the traveling cutter, as a true representation of the slight

curve of the edge would be likely to cause confusion. Fig. 5 is a side elevation of the traveling cutter. Fig. 6 is a horizontal section taken on a line located just below the top cover plate, this line being shown at 6—6 in Fig. 7. Fig. 7 is a vertical section on line 7—7, Fig. 6, looking in the direction of the arrows. Fig. 8 is a section on line 8—8, Fig. 6, looking in the direction of the arrows. Fig. 9 is a detail of the center marker for the vamp, one view of which is illustrated in Fig. 8. Fig. 10 shows a modification of the means employed for moving the edge sections for the grading. Fig. 11 shows a rotary knife which it may be desirable to employ under certain circumstances.

Referring to the drawings,—for convenience of description the elements which go to make up the device embodying my invention may be conveniently divided into three groups; the first comprises the elements which perform the grading; that is, the change in size of the pattern; the second comprises the elements which perform the cutting operation and the actuating mechanism therefor; and the third comprises the center marker and prick-marker and their actuating mechanisms.

The grading mechanism will first be described. The frame consists essentially in a top plate 20 and bottom plate 21 supported at proper distance from each other by a series of posts 22 which also serve as pivots for certain rotating parts. The said top and bottom plates 20 and 21 are substantially of the shape of the article to be cut by the use of the machine, and may be solid or in skeleton form as desired. I prefer, however, to have them solid as they then furnish a convenient place for the operator to put his fingers in holding the machine down upon the cutting board.

About the edges of the device are located edge pieces formed in sections 23 which are bent or shaped to the exact form of the object to be cut by the use of the machine. These edge pieces are in two sets, one about the top plate and one about the bottom plate and are separated by a space as will be plainly seen in Fig. 2. The edge pieces or sections are cut diagonally at their proximate ends as shown in Fig. 2, so that when separated by being moved outwardly from the center of the pattern as seen in dotted lines in Fig. 6, they will still overlap and

form a continuous track or guide upon which a traveling cutter may run without interruption. The length of the sections 23 and the location of the cuts or joints is determined by the shape of the curve.

The mechanism by means of which the edge sections 23 are simultaneously moved out or in as the case may be to effect the grading or change in size of the pattern will now be described. Near the center of each face of the machine is located a finger 24 mounted upon a movable axle 25 carried in the top and bottom plates 20 and 21. The said finger 24 is located in a circular depression 26 in the top or bottom plate as the case may be with its top face flush with the surface of the plate. About the edge of the circular depression 26 are located numbers 27 indicating the sizes and half sizes to be cut by the use of the implement. By setting the finger 24 at any of the index figures 27, the pattern will be graded or set to the size corresponding thereto. When it is desired to move the finger 24, it is lifted up slightly against the spring 28 which is between a small head 29 on the axle or stud 25 and a shoulder 30 on the lower side of said finger 24 so that the pin 31 is lifted out of the hole 32 in the bottom of the depression 26 and the finger 24 is free to rotate. When the desired position of the finger 24 is reached, the pin 31 is then allowed to snap into the corresponding hole 32 in the bottom of the depression 26. By this means, the grading mechanism is held in any desired position so long as may be necessary.

Fast to the stud or axle 25 is a sprocket wheel 33 which engages an endless chain 34, see Fig. 6, which runs inside the periphery of the device following somewhat its contour and being guided by other sprocket wheels 35 on the posts or studs 22. One of these posts 22 and attached mechanisms is provided for each edge section, but only that one shown on the left hand side of Fig. 6 and in sectional elevation in Fig. 7 will be described, as the construction of all of them is similar.

On each end of the stud or axle 22 is a small gear or pinion 36 which meshes with a rack 37 on the extreme end of which is an arm 38 rigidly connected to the corresponding edge section 23. The rack 37 is slidably mounted in a housing 41 which is pivoted on the stud 22 for purposes of adjustment and held in place by a screw 39 engaging the corresponding bed plate. The screw 39 is located in a slot 40 in a wing or extension 42 of the housing 41 so that the housing may be swung slightly about the pivot 22 and then secured in place when the proper position has been determined upon. The moving mechanism for each of the edge sections 23 is the same, and wherever the edge section is convex, the chain 34 passes on the outside of the

sprocket 35, but where the edge section is concave as is the case about the throat of the vamp, the studs 22 are so placed as to enable the chain to be passed on the inside of the sprocket wheels. It will be seen that in this manner the chain can properly be guided about the entire periphery of the device.

From the foregoing, it will be seen that, when the finger 24 is moved to change the grade of the device, the chain 34 is moved one way or the other slightly, and that each of the studs 22 is thereby given its proper rotation so that its corresponding edge section is moved toward or away from the bed plate as the case may be. As certain of the edge sections 23 require to be moved a greater distance than others of the edge sections, I vary the size of the sprockets 35 according to the amount of movement required of the corresponding edge section. Thus, it will be seen that the sprockets operating the edge sections at the toe of the vamp are of large size since the said edge sections require to be given but a slight movement; while the sprockets operating the edge sections at the heel of the vamp are given a small size as the corresponding edge sections require a large movement. It will also be seen that great accuracy in the grading may be attained by this construction.

The traveling cutter and operating mechanism therefor will now be described. The cutting mechanism consists of a knife 43 carried in a traveling head which is caused to revolve about the periphery of the device on the movable edge sections 23 as an orbit. It is propelled by means of a second endless chain 44 which, for convenience, may be denominated the cutter chain. This chain is guided and supported by means of stationary guides consisting of a pair of horizontal rods or wires 45 one on each side of the chain and supported on uprights 46. Said rods or wires 45 are bent so that they follow the periphery of the edge sections at a substantially constant distance therefrom. They are broken at the heel end of the vamp to permit the chain to pass over idle sprocket wheels 47 and at the toe end to permit them to pass over the sprocket wheel 48 by means of which the chain is driven. Said sprocket wheel 48 is fast on a stud 49 having its ends in bearings in depressions 50 in the bed plates of the device. Said stud 49 has a square socket formed in its end for engagement with the end of a flexible shaft to be connected with some source of power not shown. I have not thought it necessary to show the flexible shaft or the means by which it is rotated as these devices form no part of my invention. A clutch or means for stopping and starting the flexible shaft at the proper time may also be provided.

As will be observed from an inspection of Fig. 6, the cutter chain follows the

periphery of the implement quite closely and is at a substantially uniform distance from it at all points, but the grading chain which actuates the edge pieces is not so located, it being only necessary that the chain should engage the several sprockets which operate the racks. The traveling carriage which supports the knife 43 consists of two blocks 51 and 52 of a thickness slightly less than the distance between the upper and lower sets of edge sections 23. These two blocks 51 and 52 are yieldingly held together by means of the springs 53 on the guide pins 54. The block 51 is provided with a stud 55 extending above and below the said block and having thereon two rollers 56 which contact with the inner surface of the edge sections 23. The outside block 52 is likewise provided with two rollers 57 mounted on a stud 65 and these rollers contact with the outer surface of the edge sections. The two pairs of rollers 56 and 57 are held in contact with the corresponding surfaces of the edge sections by means of the springs which allow the said pairs of rollers to separate slightly when the traveling carrier is passing over a curved portion of the edge section or a joint between two of the edge sections. I consider this construction desirable because the separation of the edge sections due to their outward movement tends to displace laterally the proximate ends of the edge sections slightly in cases where the diagonal joints or cuts come near or at curves in the edge sections. It also allows the traveling carriage to pass around the sharper curves more readily.

The traveling carriage is connected to the cutter chain 44 by means of a link 59 pivoted at one end to the stud 55 on the inside block 51 of the traveling carriage and at the other end to an offset arm or special link 60 of the chain 44. The cutter chain 44 travels in the direction of the arrow on Fig. 6 and pushes the traveling cutter along with it. The offset arm or special link 60 applies the force to the carriage in such direction that the carriage may be pushed around even sharp curves. The fact that the link 59 is pivoted to the stud 55 which is in the center of the carriage also assists materially in the proper operation of the device.

Two small filling pieces or bars 61 of triangular cross-section are placed adjacent the roller 57 and help to steady the carriage as it travels and prevent any improper swinging motion.

It will be understood, of course, that the device embodying my invention is identical on its top and bottom sides and that it is used right side up to cut a piece for a right shoe and bottom side up to cut a piece for the left shoe, the operator holding the de-

vice down upon the leather with his hand during the cutting operation. As it would endanger the hand of the operator if the blade of the knife for the top side were allowed to project above the upper edge while the cutting at the lower edge was going on, I provide means for moving the knife into operative position on the lower side and at the same time out of operative position on the upper side so that the device may be used in perfect safety. This means consists in making the whole length of the double bladed knife 43 of a length slightly less than the thickness of the machine and mounting the knife-holder 65 slidably in the said carriage so that the knife may be moved down to the lower face just before the cutting is to take place. When the machine is turned over to cut the piece for the left hand shoe, the knife is again moved down into proper position. It will, therefore, be seen that the knife has three positions; first, the mid position shown in Fig. 2; and two cutting positions, one for each side of the machine, one of which is shown in Figs. 4 and 5. This is accomplished by mounting the knife-blade holder slidably in the sleeve 62 upon the block 52. Said sleeve 62 is slotted at 63 to permit the stud 64 to engage the knife-holder 65. Said stud 64 is also engaged by a lever 66 pivoted at 67 to the block 52 and a spring 68, see Fig. 1, is placed between the head of the stud 64 and the lever 66.

In the end of the lever 66 opposite the pivot 67 is located a handle 69 having a projection 70, see Fig. 4, on the face of the lever 66 which is next the block 52. The said projection 70 catches either above or below the edge of the block 52 to hold the knife blade holder in its respective working positions or in a hole 71 in said block 52 to hold the knife in its mid position.

The knives employed may be thin blades of highly tempered steel shaped and ground like the point of an ordinary shoe cutter's knife; such a knife is shown in Figs. 4 and 5; or the knife may be a roller 78 as shown in Fig. 11. In either case the knife is adjustably mounted on the knife-holder by means of the screw 79 and may be removed or adjusted as desired.

As is well known to those skilled in the art, it is customary for the cutter to prick-mark each piece of leather after he has cut it out by means of a hole in the pattern to indicate to the person who assembles the parts of the shoe a point which must register with a similarly prick-marked point on the adjacent piece. This is accomplished in the machine embodying my invention by means of a pointed pin or needle 80, see Figs. 2 and 4, normally held with its point flush with the surface of the edge piece within which it is contained by means of a

spring 81 and having its rounded head projecting above the upper edge of the edge section so that the block 52 of the traveling cutter carriage will contact with the said rounded head and depress the pin against the pressure of the spring 81 once for each revolution of the cutter. A pair of these prick-markers are provided as will be plainly seen from Figs. 2 and 4, one for the top and one for the bottom of the machine.

A center marker for the vamp is also provided, see especially Figs. 1, 6, 8 and 9. It consists of a pivoted center marker 82 having a blunt lower edge, see Fig. 9. Said center marker is pivoted at 83 to lugs 84 on the top or bottom plate as the case may be, and is guided between two other lugs 85 between which extend a pin 86. The said pin 86 passes through a slot 87 in said center marker and prevents the displacement of the center marker when the machine is reversed while allowing the center marker play sufficient for its purposes. Each center marker is operated by a cam 88 fast to a link of the cutter chain 44 which engages an upward extension 89 on the center marker 82. It will, therefore, be seen that the passage of the cam 88 on the chain 44 will depress the center marker and cause the same to make a crease or dent in the surface of the leather at the right point. The effective edge of the center marker passes through a slot 90 in the bottom plate.

In Fig. 10 I have shown a modification of the means herein described for actuating the edge sections. This is particularly adapted for use in cases where the interior space of the machine is restricted by reason of the shape of the piece or article to be cut. It consists of a slotted link 91 pivoted at 92 to the top and bottom pieces and actuated by a second link 93 connected with a suitable moving part of the machine. The walls of the slot 94 engage a pin 95 on a sliding bar 96 on the end of which is carried the edge section. Said sliding bar 96 is guided in a suitable housing 97. In Fig. 10 I have shown a means of operating a second edge section and I have shown the link 93 as connected to the operating link 98 of the second edge section and have shown both as being moved by the link 99.

It will readily be understood that the edge sections may be operated independently or in pairs or groups as is considered most desirable.

I claim as my invention:

1. An implement of the character described, comprising a bed plate, edge pieces surrounding the bed plate, moving means for each of the said edge pieces and an endless chain actuating the moving means for all the edge pieces.

2. In an implement of the character described, a bed plate, edge pieces surround-

ing the said bed plate and forming a pattern, and means for moving said edge pieces to change the size of the pattern, said edge pieces having their proximate ends overlapping in the plane of the edge pieces.

3. An implement of the character described, comprising top and bottom plates, two sets of edge pieces, one set surrounding said top plate and one set surrounding said bottom plate and forming a pattern, means for moving said edge pieces to change the size of the pattern, and a cutter traveling on said edge pieces, said edge pieces having their proximate ends overlapping in the plane of the edge pieces.

4. An implement of the character described, comprising top and bottom plates, two sets of edge pieces, one set surrounding said top plate and one set surrounding said bottom plate, said sets of edge pieces being separated from each other by a horizontal space, means for moving said edge pieces to change the size of the pattern and a cutter traveling on said edge pieces in said horizontal space, said edge pieces having their proximate ends overlapping in the plane of the edge pieces.

5. An implement of the character described, comprising a bed plate, edge pieces surrounding the bed plate, a rack and pinion to move each edge piece, a shaft for each pinion, a sprocket on each pinion shaft, and an endless chain engaging all said sprockets whereby movement of the endless chain will produce simultaneous movement of all the edge pieces.

6. An implement of the character described, comprising a bed plate, edge pieces surrounding the bed plate, a rack and pinion to move each edge piece, a shaft for each pinion, a sprocket on each pinion, some of said sprockets being of different sizes and an endless chain engaging all said sprockets, whereby movement of the endless chain will simultaneously produce different extents of movement of all the edge pieces.

7. An implement of the character described, comprising a bed plate, edge pieces surrounding the bed plate and forming a pattern, a rack and pinion to move each edge piece, a shaft for each pinion, a sprocket for each shaft, and an endless chain passing outside said sprockets where the curve of the pattern is convex and inside said sprockets where the curve of the pattern is concave, whereby movement of the endless chain will produce simultaneous movement of all the edge pieces, and the said chain will be kept in engagement with said sprockets.

8. An implement of the character described, comprising a bed plate, edge pieces surrounding the bed plate, a rack and pinion to move each edge piece, a housing for said rack pivotally attached to said bed plate,

adjusting means for said housing, a shaft for each pinion, a sprocket on each shaft, and an endless chain passing outside said sprockets where the curve of the pattern is convex and inside said sprockets where the curve of the pattern is concave, whereby movement of the endless chain will produce simultaneous movement of all the edge pieces, and the said chain will be kept in engagement with said sprockets.

9. An implement of the character described, comprising a bed plate, edge pieces surrounding the bed plate, a rack and pinion to move each edge piece, a housing for said rack pivotally attached to said bed plate, said housing having a slot therein, a screw passing through said housing to fix the position of said housing, a shaft for each pinion, a sprocket on each pinion shaft and an endless chain engaging all said sprockets whereby movement of the endless chain will produce simultaneous movement of all the edge pieces.

10. An implement of the character described, comprising an adjustable pattern and a traveling cutter revoluble about the periphery of said pattern.

11. An implement of the character described, comprising a bed plate, edge pieces surrounding the bed plate and a traveling cutter movable on the said edge pieces about the periphery of the implement.

12. An implement of the character described, comprising top and bottom plates, two sets of edge pieces, one set surrounding said top plate and one set surrounding said bottom plate, having a space between said top set and said bottom set and a traveling cutter movable about the periphery of the implement in the space between said top set and said bottom set.

13. An implement of the character described, comprising an adjustable pattern and a traveling cutter revoluble about the periphery of said pattern, said cutter being provided with two knives, one for the top and one for the bottom of the pattern.

14. An implement of the character described, comprising an adjustable pattern, a traveling carriage revoluble about the periphery of said pattern, a knife-holder in said traveling carriage, two knives on said knife-holder, one for the top and one for the bottom of said pattern, said knife-holder being slidably mounted on said carriage to bring one or the other of said knives into operative position.

15. An implement of the character described, comprising an adjustable pattern, a traveling cutter revoluble about the periphery of said pattern and an endless chain to move the said traveling cutter.

16. An implement of the character described, comprising an adjustable pattern, a

traveling cutter revoluble about the periphery of said pattern, an endless chain to move the said traveling cutter, and guides for the said endless chain.

17. An implement of the character described, comprising an adjustable pattern, a traveling cutter revoluble about the periphery of said pattern, an endless chain to move the said traveling cutter, guides for the said endless chain and moving means for the said traveling cutter, said guides being broken to permit the said moving means to engage the said chain.

18. An implement of the character described, comprising an adjustable pattern, a traveling cutter revoluble about the periphery of said pattern, an endless chain to move the said traveling cutter, guides for the said endless chain, moving means for the said traveling cutter, idle sprocket wheels at the sharp turns of the said pattern, said guides being broken to permit the said moving means and the said idle sprockets to engage the said chain.

19. An implement of the character described, comprising bed plates, edge pieces about the said bed plates, a traveling cutter carriage movable on the said edge pieces, said traveling cutter carriage comprising two halves, and springs to hold the said halves yieldingly together.

20. An implement of the character described, comprising bed plates, edge pieces about the said bed plates, a traveling cutter carriage movable on the said edge pieces, said traveling cutter carriage being provided with a roll on the inside and a second roll on the outside and engaging the said edge pieces.

21. An implement of the character described, comprising an adjustable pattern, a traveling cutter carriage revoluble about the periphery of said pattern, a cutter mounted in the said carriage, an endless chain to move the said cutter carriage, an offset arm connected to a link of the said endless chain and a link connected at one end to the offset arm and at the other end to the traveling carriage at the center of the side of the carriage next the endless chain.

22. An implement of the character described, comprising a bed plate, edge pieces surrounding the bed plate, a center marker pivoted to said bed plate, an endless chain following the periphery of said bed plate and a cam on said endless chain engaging the said center marker.

In testimony whereof I affix my signature, in presence of two witnesses.

EDWARD R. SHAW.

Witnesses:

GEORGE P. DIKE,

WILLIAM A. COPELAND.