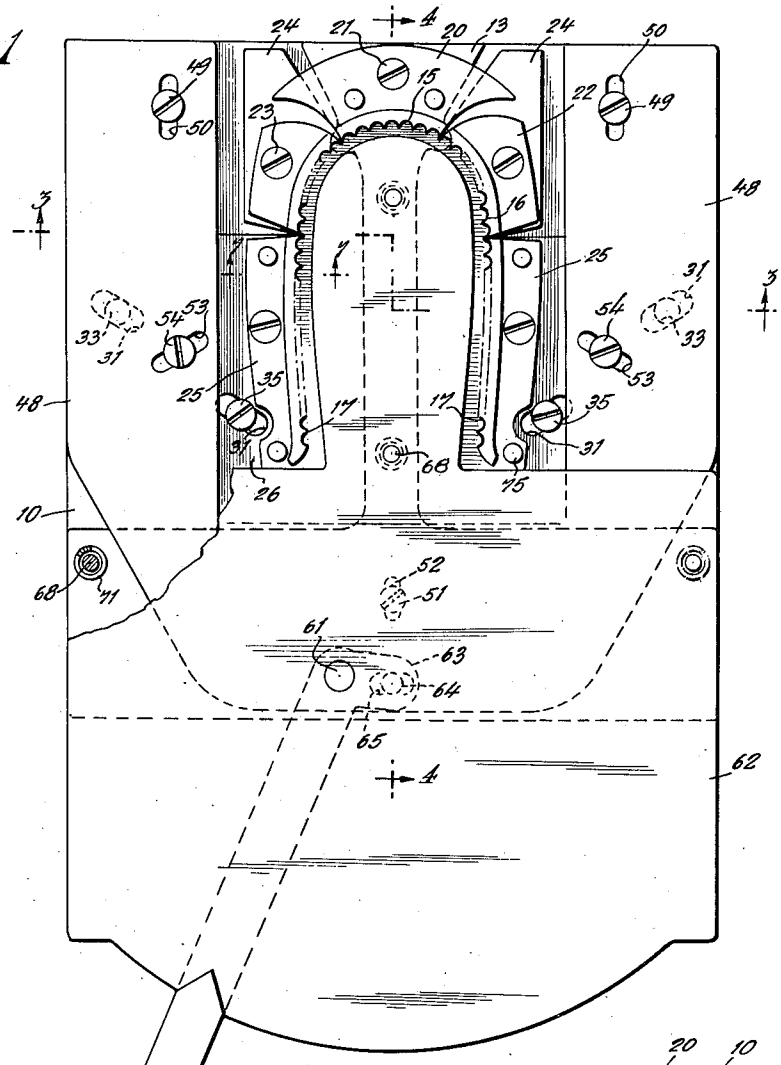
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CUTTING DIE WITH VARIABLE CONTOUR

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Fig. 1



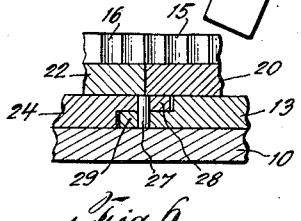


Fig. 6

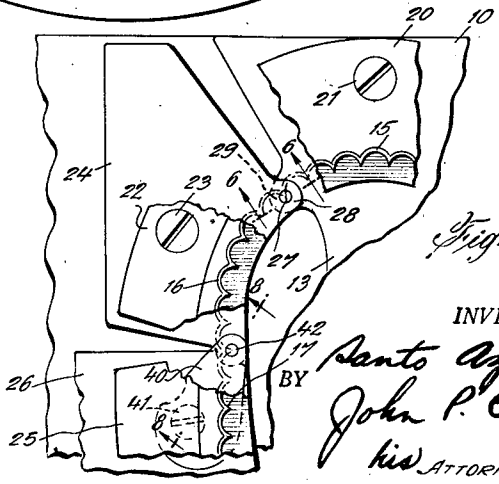


Fig. 5

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CUTTING DIE WITH VARIABLE CONTOUR

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Fig. 2

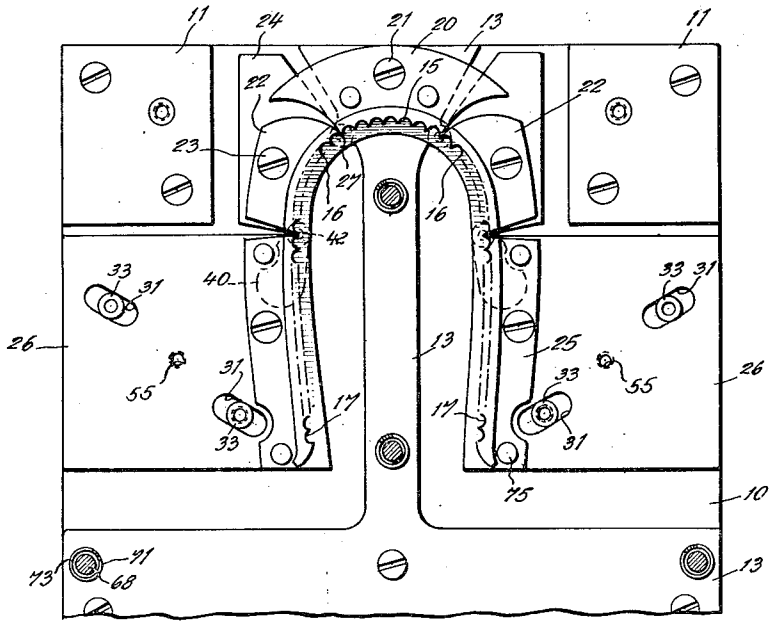


Fig. 3

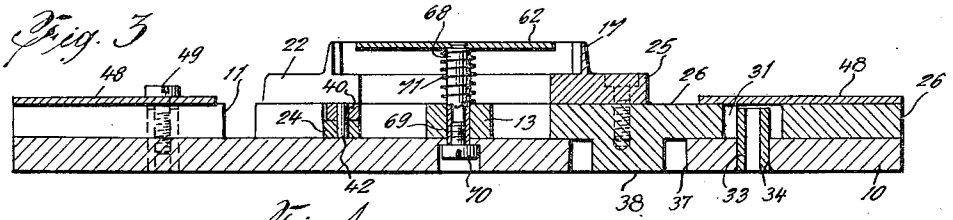


Fig. 4

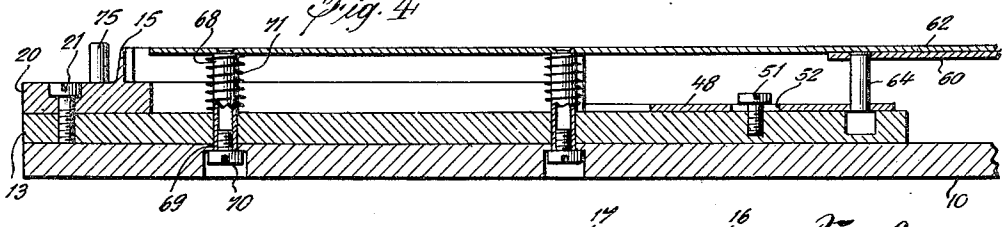


Fig. 7

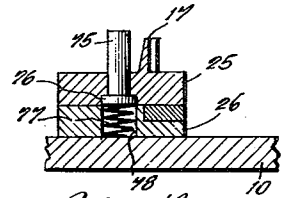
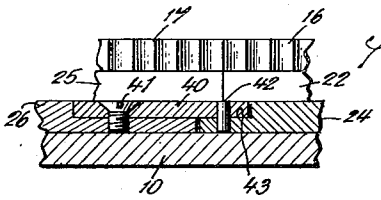


Fig. 8



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Patented Nov. 12, 1946 2,411,016

UNITED STATES PATENT OFFICE

2,411,016

CUTTING DIE WITH VARIABLE CONTOUR

Santo Azzara, New York, N. Y., assignor of fifty per cent to Andrew Geller Shoe Manufacturing Co., Inc., Brooklyn, N. Y., a corporation of New York

Application May 3, 1945, Serial No. 591,801

4 Claims. (Cl. 164—29)

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This invention relates to an improved die having a cutting edge of variable contour, and relates more particularly to a novel cutting device designed primarily, though not exclusively, for forming sock liners for shoes with a pinked or serrated edge in the heel portion of such sock liner.

The die of the present invention is formed with a continuous cutting edge lying in a single plane, the cutting edge including a plurality of contiguous sections, each section having a substantially unbroken connection with the adjoining section. The cutting element in each section may be formed integrally with, or may be appropriately secured to, a block, each of the blocks being movable in a common plane on a suitable supporting base.

If the present invention is embodied in a die having a substantially U shaped, variable cutting edge, as is illustrated in the drawings, it may include a central section mounted on the base in fixed relation, adjoining sections which are pivotally mounted on the base, the axis of the pivots coinciding with the opposed terminals of the fixed cutting section, and movable terminal sections which are contiguous with the outer terminals of the pivoted sections, such terminal sections being movable toward and away from each other. Movement of the pivoted sections is controlled by movement of the terminal sections, there being provided novel drag-link means connecting each terminal section with each pivoted section. A single lever is employed for controlling movement of the several movable sections, and accordingly the contour of the cutting edge may be quickly varied.

The device of the present invention is simple and inexpensive to construct, and is highly efficient in operation.

In the drawings:

Fig. 1 is a top plan view of a cutting die embodying the present invention, portions of the upper cover plate being cut away to show certain details of construction.

Fig. 2 is a broken plan view with the operating plate removed to show additional details of internal construction.

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

Fig. 4 is a vertical section taken on line 4—4 of Fig. 1.

Fig. 5 is a fragmentary plan view of a portion of the device.

Fig. 6 is a fragmentary section taken on line 6—6 of Fig. 5.

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Fig. 7 is a fragmentary section taken on line 7—7 of Fig. 1.

Fig. 8 is a fragmentary section taken on line 8—8 of Fig. 5.

The fixed and moving parts of the apparatus forming the present invention are mounted on a base 10 of generally rectangular contour. Spacer plates 11 are secured at two outer corners of the base. Another spacer plate 13 of inverted T shaped contour is secured to the base. The variable cutting edge is of substantially U shaped contour, and comprises a central fixed section 15, intermediate movable sections 16, and terminal movable sections 17. Fixed section 15 may be carried by, or be formed integrally with, block 20 secured to the upper surface of the outer terminal of spacer plate 13, as by means of screw 21. Movable cutting sections 16 may be carried by, or be formed integrally with, blocks 22 which are secured to slides 24 by screws 23. Similarly, movable cutting sections 17 are carried by blocks 25 which are secured to slides 26.

The method of forming the serrated cutting edges of the several sections is a matter of choice. One preferred method is to form the supporting block and the cutting edge in one piece by appropriate machining operations. The parts may also be formed separately. In order that there may be a continuous, unbroken cutting edge throughout the several sections, slides 24 are pivoted at 27, the pivot pin passing through an extension 28 of slide 24, and through an extension 29 of spacer plate 13 (Fig. 6). The pivot pin 27 is in alignment with the adjacent meeting terminals of cutting edges 15 and 16. It will thus be seen that regardless of the position of slide 24, there will be no break in the cutting edge. Arcuate movement of slides 24 about their pivots is controlled by movement of slides 26 through a drag-link connection, movement of slides 26, however, being limited more nearly to straight-line motion. Means for so limiting this movement may comprise short, diagonal slots 31 in each slide which receive bushings 33 secured in apertures 34 in base 10. The bushings have threaded holes which receive flat-headed screws 35 which retain the slides in place. Base 10 may have an opening 37 on each side thereof which receives a downward extension 38 of each slide 26, as seen in Fig. 3.

The opposed edges of each pair of slots 31 in each slide 26 are so formed as to cause the inner terminal of cutting edge sections 17 to traverse the path defined by the outer or free terminals of cutting edge sections 16 during arcuate movement thereof, thus providing a substantially

unbroken cutting edge between sections 16 and 17. In other words, the slots are not exactly parallel with each other. The aforesaid drag-link connection between each reciprocating slide 26 and the adjacent arcuately-movable slide 24 may comprise a flat link 40 (Fig. 8) secured by screw 41 to slide 26. At its opposite end, the link carries a pin 42 which passes through slide 24, the latter being appropriately recessed as shown at 43 to receive the link. This pin is aligned with the adjacent meeting terminals of cutting sections 16 and 17. The relationship between pins 42 and the holes receiving the same, and between bushings 33 and slots 31, should be such as to permit relatively free travel of the moving parts.

Movement of slides 24 carrying cutting sections 16 is thus dependent upon movement of slides 26 carrying cutting sections 17, and the former are manually moved to an adjusted, fixed position by means of a plate 48 of generally U shaped contour which is mounted for sliding, straight-line movement by means of flat-headed screws 49 which pass through slots 50 in plate 48 and into spacer plates 11, and also screw 51 which passes through a slot 52 in plate 48 and into spacer plate 13. Plate 48 is further formed with diagonal slots 53 disposed substantially at right angles to slots 31 in slides 26. Screws 54 pass through slots 53, and are received within threaded holes 55 in slides 26 substantially midway between slots 31. There should be provided sufficient clearance between slots 53 and screws 54 to permit free travel of the moving parts, particularly so since blocks 20 travel in a slightly arcuate path, as earlier pointed out.

It will accordingly be seen that as plate 48 is moved longitudinally of base 10, its movement is confined to straight-line movement due to screws 49 and 51 which are rigidly mounted in spacer plates 11 and 13, respectively, such screws passing through slots 50 and 52. Thus, it will be seen that when plate 48 is moved forwardly, the rear edges of slots 53 engage screws 54 carried by slides 26, thus forcing the slides forwardly and inwardly. This movement causes cutting sections 17 to approach each other, and, at the same time, causes the forward terminals of cutting edges 16 to move toward each other, the rear terminals thereof pivoting around pivot pins 27 due to the drag-link connection between slides 26 and 24. Conversely, when slide 48 is moved rearwardly, the forward edges of slots 53 moving against screws 54 cause slides 26 and the cutting edges 17 carried thereby to move away from each other, and likewise cause slides 24 carrying cutting edges 16 to move arcuately outwardly. Movement of plate 48 is produced by means of a lever 60 pivoted at 61 on the under-surface of a cover plate 62, the lever having a short extension 63 beyond pivot 61, such extension carrying a pin 64 which passes through a transverse slot 65 in the forward end of plate 48. The side walls of slides 24 and 26, and of blocks 20, 22 and 25, are so formed as to leave adequate clearance between the parts during movement thereof.

Plate 62 is mounted so as to be depressible downwardly by the following means. A plurality of bushings 68 are secured to the under-surface of plate 62, such bushings passing through apertures 69 in spacer plate 13 and in base 10. A headed screw 70 limits upward movement of plate 62. Interposed between the lower surface of plate 62 on each bushing 68 is a coil compression spring 71, the lower ends of the springs being positioned in shallow recesses 73 in spacer plate 13. The

length of bushings 68 is such as to cause the upper surface of plate 62 to be normally plane with the upper edges of cutting sections 15, 16 and 17. When material is placed upon the cutting edges, however, and the material moved downwardly into engagement with such cutting edges, plate 62 is also slightly depressed. Thus, at the completion of the cutting operation, the material lying within the area defined by cutting edges 15, 16 and 17 is moved away from the cutting edges by action of plate 62 returning upwardly to its maximum upward position. For the purpose of moving the material lying outside the cutting edges away from such cutting edges at the completion of the cutting operation, a plurality of pins 75 are mounted in blocks 20, 22 and 25. These pins are headed at their lower ends, as shown at 76, and are urged upwardly by means of springs 77 positioned within holes 78, shown particularly in Fig. 7.

In use, the die of the present invention may be placed in a conventional press, the press forming no part of the invention. When the die has been adjusted to desired contour, the material is placed on the upper surface of the cutting edge, and a suitable member then moved downwardly, forcing the material into engagement with the cutting edge. When the member is again moved upwardly, the material may be removed from the die and the operation continued. From the foregoing, it will be apparent that the edge of the cutting die may be varied from the smallest to the largest size of heel, and the adjustment from one size to another is performed with ease and facility.

While one form or embodiment of the invention has been shown and described herein for illustrative purposes, and the construction and arrangement incidental to a specific application thereof have been disclosed and discussed in detail, it is to be understood that the invention is limited neither to the mere details or relative arrangement of parts, nor to its specific embodiment shown herein, but that extensive deviations from the illustrated form or embodiment of the invention may be made without departing from the principles thereof.

What I claim is:

1. A cutting die provided with a variable cutting edge, the cutting die being of generally U shaped contour and formed in a plurality of sections providing a substantially unbroken cutting edge, and including an intermediate, fixed section, a movable section pivotally mounted at each end of the fixed section, and a movable terminal section adjoining each end of the first movable sections, means for limiting movement of the terminal sections to substantially straight-line movement generally toward and away from each other, an operating lever for causing simultaneous movement of the terminal sections toward and away from each other, and drag-link means connecting the inner ends of the terminal sections with the free ends of the pivoted sections to cause movement toward and away from each other during similar movement of the terminal sections.

2. A cutting die formed with an uninterrupted cutting edge of variable, substantially U shaped contour lying in a single plane and formed in a plurality of adjacent sections, each section including a cutting element and a support therefor, a base for supporting the several sections, such sections including a fixed, intermediate section, a

movable section pivotally mounted adjacent each end of the fixed section, and a movable terminal section mounted for reciprocating movement adjacent each free terminal of the pivoted sections, means for moving the reciprocating sections conjointly generally toward and away from each other, link means connecting the inner terminals of the reciprocating sections with the outer terminals of the pivoted sections to cause movement thereof when the reciprocating sections are moved to an adjusted, fixed position, and guide means for the terminal sections comprising a plurality of pins mounted in the base, each terminal section having a plurality of elongated slots through which the pins pass, the contour of the slots being so formed as to limit movement of the inner ends of the terminal sections to the paths defined by the outer ends of the pivoted sections during movement thereof.

3. A cutting die formed with a substantially uninterrupted cutting edge of variable contour lying in a single plane, the die being provided with a base, an intermediate, fixed cutting-edge section mounted on the base, a slide pivotally mounted on the base adjacent each terminal of the fixed section, a cutting-edge section carried by each pivoted slide, and a reciprocating slide mounted on the base adjacent each free terminal of the pivoted slides, means for limiting movement of the reciprocating slides to angular, substantially straight-line movement generally towards and away from each other, means for effecting such movement, and means comprising a link connecting the inner end of each reciprocating slide with the free end of each pivoted slide to cause conjoint movement of the latter when the reciprocating slides are moved.

4. A cutting die formed with a substantially uninterrupted cutting edge of variable, substantially U shaped contour lying in a single plane, the die being provided with a base, an intermediate, fixed cutting-edge section mounted on the base, a slide pivotally mounted on the base adjacent each terminal of the fixed section, a cutting-edge section carried by each pivoted slide, and a reciprocating slide mounted on the base adjacent each free terminal of the pivoted slides, means for limiting movement of the reciprocating slides to movement generally towards and away from each other, means comprising a manually-operable lever for effecting such movement, and means comprising a link connecting the inner end of each reciprocating slide with the free end of each pivoted slide to cause conjoint movement of the latter when the reciprocating slides are moved toward or away from each other by the operating lever.

SANTO AZZARA.