May 27, 1930. J. FOSSA 1,759,842

CUTTING DEVICE

Filed March 15, 1924

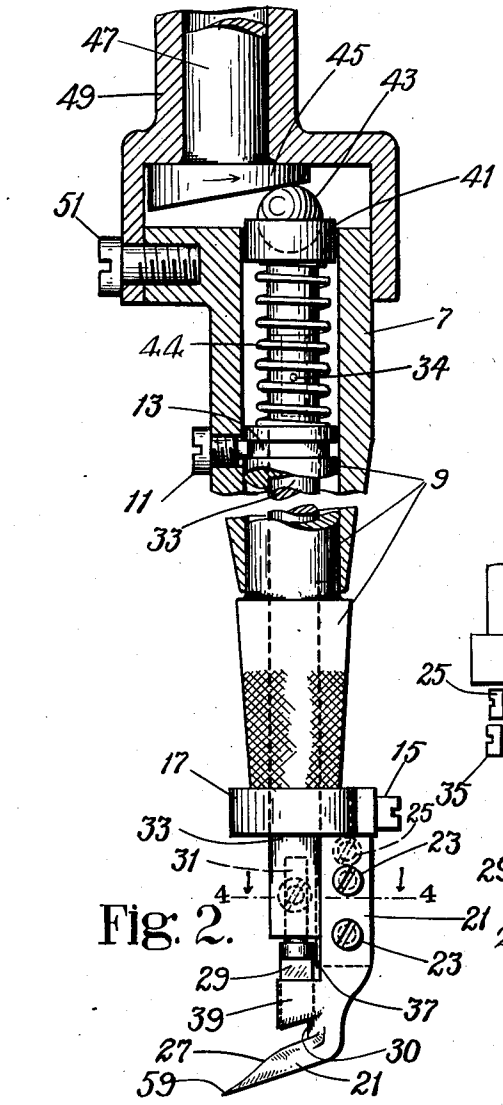


Fig. 2.

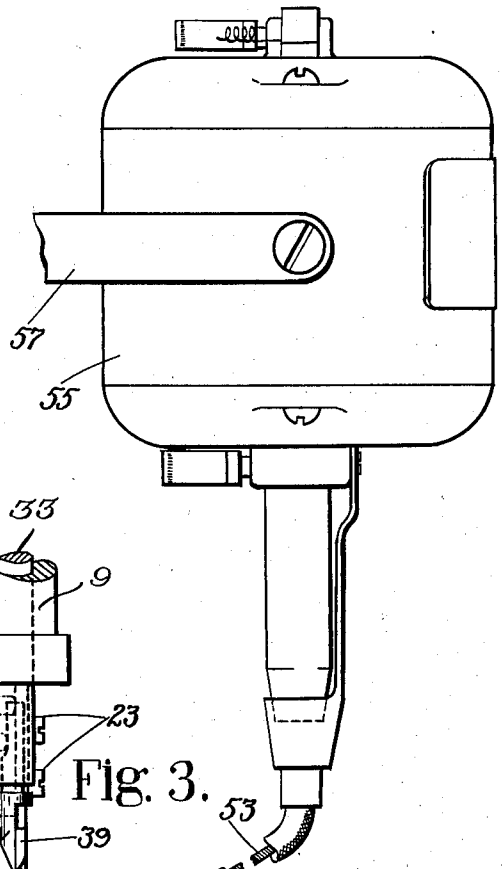


Fig. 1.

Fig. 3.

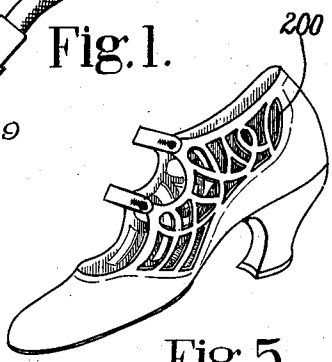


Fig. 5.

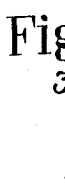


Fig. 4.

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UNITED STATES PATENT OFFICE

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CUTTING DEVICE

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This invention relates to the cutting of sheet material and is herein illustrated as embodied in a hand tool for use in the manufacture of boots and shoes.

In the manufacture of certain kinds of shoes, it is customary to die out ornamental openings in the upper, to attach the lining to the upper by stitches which extend along the edges of the openings in the upper, and later to cut out those portions of the lining which are exposed by the died-out openings in the upper. The portions of the lining which are thus exposed are commonly called "panels" and the operation of cutting them out as "panel cutting." The panel cutting may be done in the stitching-room before the lined upper has been attached to the sole or insole of the shoe; but preferably is done in the packing-room after the shoe is otherwise complete or substantially so, since if the cutting is done in the stitching-room, the subsequent stretching of the upper during the pulling-over and lasting operations is liable to distort the ornamental openings.

Although machines have come into use for successfully performing this operation, it is still largely performed by hand, the operator making use of a knife having a slender blade and a sharp point. A hand tool is less expensive than a machine and is desirable when the smaller and more inaccessible panels are to be cut out; but the manual operation, with the knife referred to above, is slow and for that reason expensive.

The general object of the present invention is to provide a hand tool by the use of which panel cutting and similar trimming operations may be carried out more efficiently and rapidly than hitherto.

According to one feature of the invention, there is provided a shear member adapted to engage one side of the material, a chisel-shaped cutter adapted to operate from the other side and novel means including a flexible shaft for operating the cutter. In the illustrative device the shear member projects laterally beyond the cutter and has a pointed end by which the material may be readily pierced to place the device in operative position. In the operation of the tool, the operator pushes the point of the shear member through the panel close to the edge of the opening in the upper and then runs the device around the edge of the opening to cut out the panel.

It is desirable that the cutting means be susceptible of being turned readily so that the cuts will all be flush with the edge of the opening or other guiding edge of the upper. Accordingly, another feature of the invention provides for turning the cutting means by a relatively slight movement of the thumb and a finger instead of requiring a movement of the entire hand in which the tool is held. The illustrated device is adapted to be held as a pencil is held, and comprises a stem or handle freely movable in all directions and consisting of two relatively rotatable, tubular sections, one of which is adapted to be held between the tips of the thumb and forefinger while the other section rests against another part of the hand. The mechanism for operating the cutting means is carried by the latter section, but the movable cutter is fixed to a bar or plunger which slides forward and back in the handle and is keyed to the first-mentioned section of the handle to be turned thereby. Moreover, the shear member is affixed to the first-mentioned section so that it will be turned with the reciprocatory cutter and maintained in cooperative relation thereto.

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

Referring now to the accompanying drawings:—

Figure 1 is a perspective of an illustrative

device in which the invention is embodied, a shoe being shown in process of being operated upon.

Figure 2 is a view on an enlarged scale partly in elevation and partly in section of the device exclusive of the flexible shaft and motor, the upper portion of the casing and the stem of the driving cam being broken off.

Figure 3 is an elevation of the lower portion of the device.

Figure 4 is a cross-section on the line 4—4 of Fig. 2 looking in the direction indicated by the arrow, and

Figure 5 is a perspective of a finished shoe.

As shown by Fig. 1, the tool comprises a tubular handle consisting of two sections 7 and 9. Each of these sections is tubular, as shown in Fig. 2, and they have a swivel connection that provides for turning one about an axis relatively to the other. Held on the lower end of the section 9 by a set screw 15 is a collar 17 having a downwardly extending support 19 to a flat face of which a shear blade 21 is fastened by two screws 23 which pass loosely through holes in the stem of the shear member and are threaded into the support. A third screw 25 is threaded through the support from the other side and engages with its end one side of the stem of the shear member. By loosening the screws 23 and turning the screw 25, the shear member may be swung to the right or the left as viewed in Fig. 3, as may be desired to bring its shearing edge 27 into proper relation with the edge of a chisel-shaped cutter 29.

This cutter has a stem 31 which extends into a socket in the lower end of a plunger or cutter-bar 33 and is held fast by a set screw 35. The cutter-bar extends up through and is guided by a bore in the section 9 and has at its lower end a slot or guideway to receive a guide in the form of a rib 37 which is integral with the support 19 of the shear member 21. The cutter-bar 33 is, for convenience in assembling the device, made in two parts, the upper end of the lower part having a socket to receive a reduced portion of the upper part, the two parts being fastened together by a pin 34.

At its upper end the cutter-bar has a head 41 provided in its upper face with a semi-spherical socket to receive a ball 43. Above the ball and in engagement with it is a cam 45, the flat, operative, under face of which is inclined as shown. The cam is effective to force the plunger 33 down against a compression spring 44 which is arranged to impart the return movement and to maintain the ball in contact with the cam. This cam is carried at the lower end of a stem 47 which is rotatable in a bore in a member 49. The members 7 and 49 form a casing for enclosing the cam, and are fastened together by a screw 51. The axis of the stem 47 of the cam is offset from the axis of the cutter-bar 33, but the two axes are parallel. This arrangement of the axes not only renders the flat oblique face of the cam effective to furnish the desired reciprocatory motion but also enables that face to remain continuously in engagement with the ball. Moreover, since the rotation of the cam causes a gradual change of direction of the inclination of the oblique face, the resultant reciprocations are necessarily brought about smoothly, that is, without any harsh or sudden action. The stem of the cam is connected to the lower end of a flexible shaft 53, the upper end of which is connected to the shaft of a small motor 55, the motor being mounted on a stand a portion of which is shown at 57 or suspended in any other suitable manner so as to be out of the way of the operator.

Integral with and extending laterally from the stem of the shear member 21 is a guard or guide 39 one face of which is in contact with the adjacent flat face of the cutter 29, and extending downwardly from the under side of this guide is a vertical edge 30.

The shearing portion of the member 21 preferably projects laterally beyond the cutter 29 and is tapered to a sharp point 59. This point is adapted to pierce the lining so that the shear member may be readily inserted through the latter, the extent of the lateral projection being sufficient to maintain the cutter 29 out of contact with the work while the user's attention is devoted to the piercing operation.

In the operation of the device, the operator holds the shoe in one hand and grasps the handle section 9 with the thumb and the index and middle fingers so that the section 7 will rest against another part of the hand in the manner shown in Fig. 1. He pushes the sharp point 59 of the shear blade 21 through the panel 100 close to the edge of the opening in the upper and proceeds to cut out the panel, incidentally moving the thumb and index finger to turn the section 9 as may be necessary to maintain the cutting edges parallel to the edge of said opening. The extent of the path of reciprocation of the cutter 29 is comparatively small, and preferably the cutter 29 is adjusted into such a position relatively to its plunger 33 that, in its operation, its edge does not rise above the level of the upper of the shoe but remains in lapped relation to the guiding edge of the upper. By so adusting the cutter, the danger of accidental cutting of the upper is greatly reduced.

In Fig. 5 is shown a rather extreme example of the style of shoe which has cut-outs. It will be noted that some of these cut-outs, such for example as the one indicated at 200, have edges which meet at acute angles. In such cases it is sometimes impractical to turn the holder at the sharp angle,

in which case the panel may be more readily removed by making two cuts which meet at the apex of the angle.

Although the invention has been set forth as embodied in a particular device and in connection with the making of endless cuts to remove panels, it should be understood that the invention is not limited in the scope of its application to the particular device nor to the particular work which has been shown and described.

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

1. A power-operated hand-tool comprising a tubular handle consisting of two relatively rotatable tubular sections having a swivel connection whereby one of them may be grasped and turned by a thumb and finger, a plunger arranged in said handle and having a spline connection with said one of said sections to be turned thereby, a cutter affixed to said plunger, and mechanism carried by the other one of said sections to reciprocate said plunger lengthwise, said mechanism including a flexible element adapted to be connected to a source of power to operate the mechanism.

2. A power-operated hand-tool comprising a tubular handle consisting of two relatively rotatable tubular sections having a swivel connection, a shear member affixed to one of said sections to be turned thereby, a plunger arranged to slide in said one of the sections and having a spline connection therewith to be turned with said shear member, a cutter affixed to said plunger to cooperate with said shear member, and mechanism carried by the other one of said sections to reciprocate said plunger lengthwise.

3. A hand-tool for cutting sheet material comprising a handle element having a bore, a plunger arranged to slide in said bore and having a cutter at one end rigidly related thereto, a sharp-pointed shearing blade affixed to said handle element and arranged to cooperate with said cutter, a member freely movable in all directions to which said handle element is connected by a swivel joint to turn relatively thereto, means to cause said plunger to turn with said handle element, and mechanism carried by said member to reciprocate said plunger.

4. A power-operated hand-tool for cutting out panels of lining in a shoe upper, comprising a tubular handle freely movable in all directions and adapted to be held as a pencil is held for writing, a plunger arranged to slide lengthwise in the bore of said handle, a chisel-shaped cutter affixed to the lower end of said plunger, a sharp-pointed shearing blade affixed to said handle to cooperate with said cutter, and mechanism carried by the upper end of said handle to reciprocate said plunger.

5. A machine for cutting out panels of lining in a shoe upper, comprising a holder, a plunger carried and guided thereby, a chisel-shaped cutter carried by said plunger, rotary means arranged to engage and reciprocate said plunger, and a shear member fixed to said holder in cooperative relation to said cutter, said shear member having a pointed portion projecting laterally beyond said cutter to pierce the lining before the cutter engages the work.

6. A machine for trimming off lining material projecting beyond an edge of a shoe upper, comprising a shear member having a point adapted to pierce the lining adjacent to said edge, a holder to which said shear member is fixed, a plunger arranged to slide in said holder, a chisel-shaped cutter carried by said plunger and arranged to cooperate with said shear member, a rotary operating cam arranged to act against one end of said plunger, and a spring arranged to maintain said plunger against said cam.

7. A hand tool for cutting sheet material having, in combination, a shear member having a pointed portion by which the material may be pierced, a cooperating cutter, a cutter-guard located above the edge of the shear member, a holder for the shear member, a casing in which the holder is rotatable, a cutter-bar extending through the holder, and means for reciprocating the cutter.

8. A hand tool for cutting sheet material having, in combination, a shear member having a pointed portion by which the material may be pierced, a cooperating cutter, a cutter-guard located above the edge of the shear member, a holder for the shear member, a casing in which the holder is rotatable, a cutter-bar extending through the holder, and means for reciprocating the cutter, said means including a ball carried by the cutter-bar, a cam engaging the ball, a spring for holding the cam and ball in contact, and means for rotating the cam.

9. A machine for cutting out portions of sheet material wholly within the margin thereof, comprising a plunger, means for guiding said plunger, a chisel-shaped cutter fastened to one end of said plunger, mechanism for reciprocating said plunger lengthwise, and a thin shearing blade arranged to cooperate with said cutter, said blade having a sharp point projecting laterally beyond the path of movement of said cutter to pierce an internal area of the sheet material and to lead the pierced portion into the range of operation of said cutter.

10. A hand-tool for cutting sheet material comprising a freely movable handle consisting of two tubular members connected in coaxial relation by a swivel joint, one of said members being adapted to be grasped and turned by a thumb and forefinger while the other lies on the hand between the thumb

and forefinger, a plunger extending through both of said handle members and having a bearing in one of them to guide it in right lines, cooperative shearing cutters affixed respectively to said plunger and to said one of said handle members, and rotary means carried by the other one of said members to engage and operate said plunger.

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

JOSEPH FOSSA.