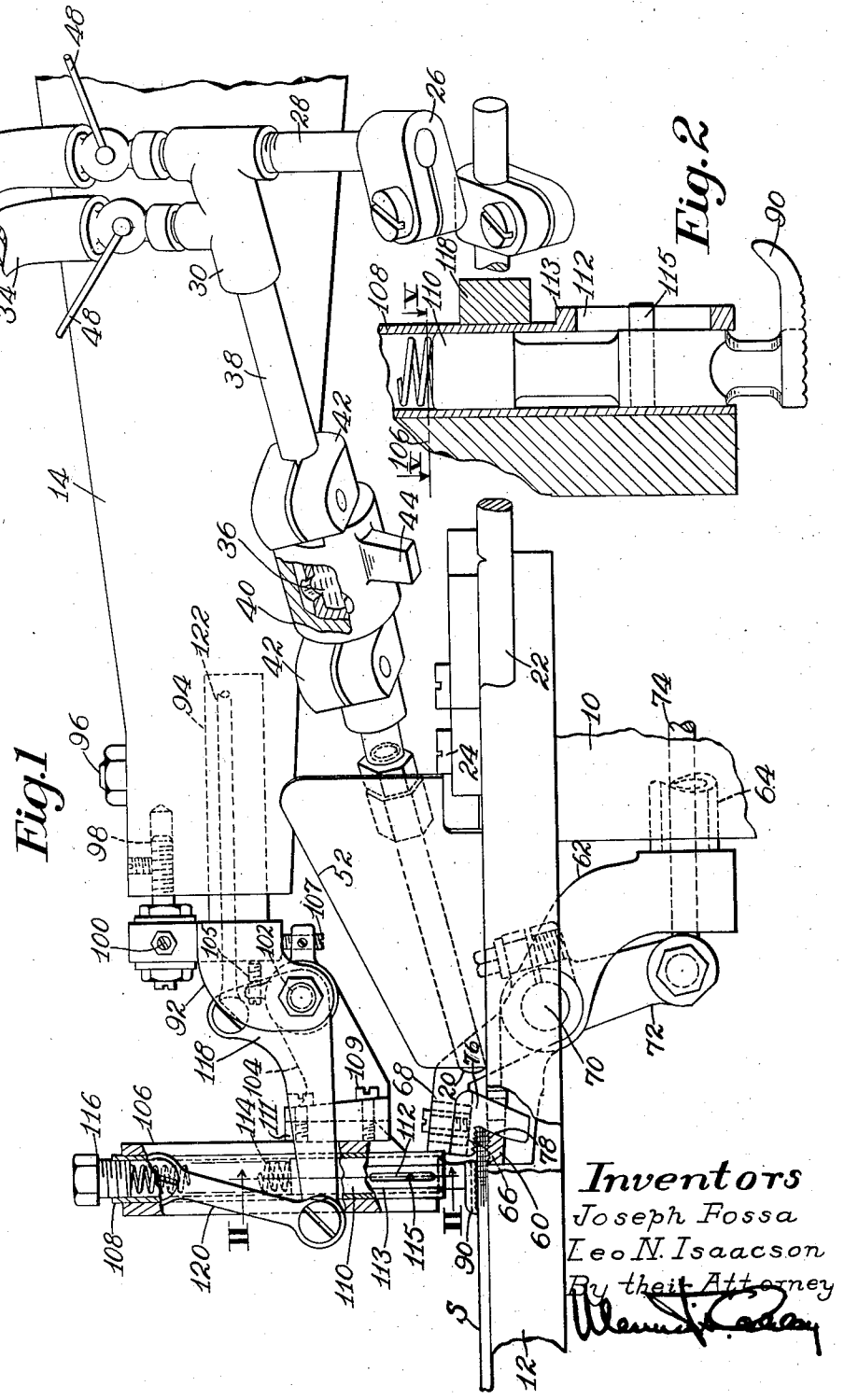
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EDGE TREATING MACHINE

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EDGE TREATING MACHINE

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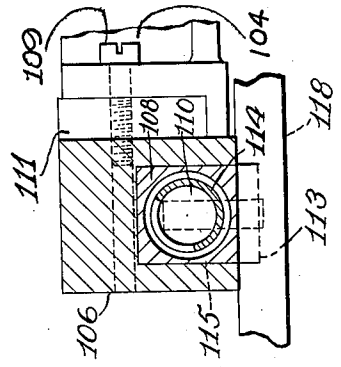


Fig. 5

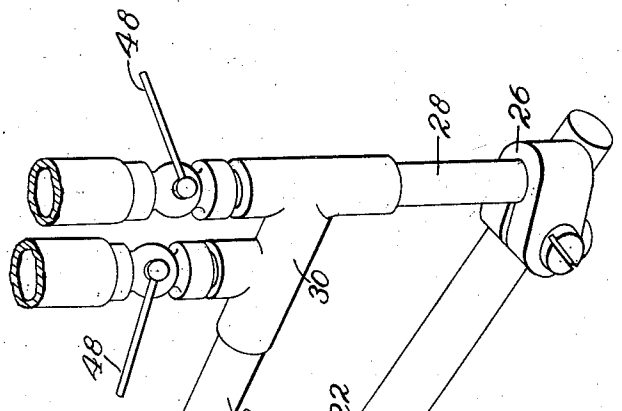
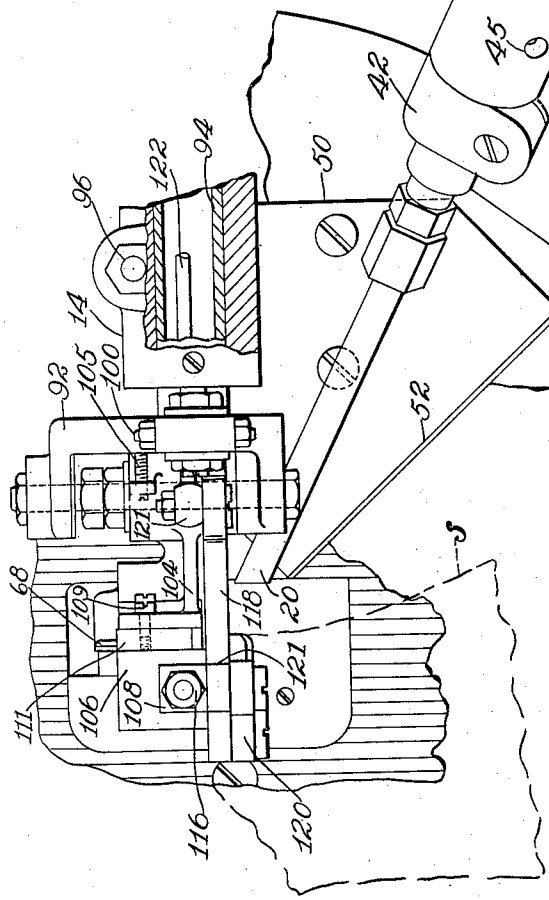


Fig. 3



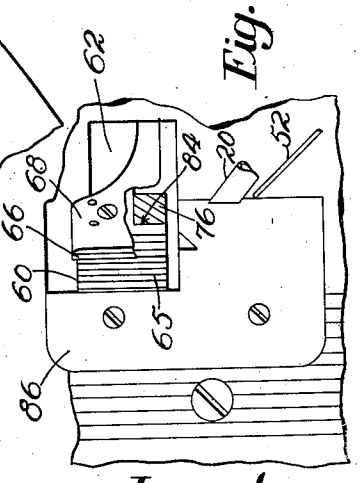


Fig. 4

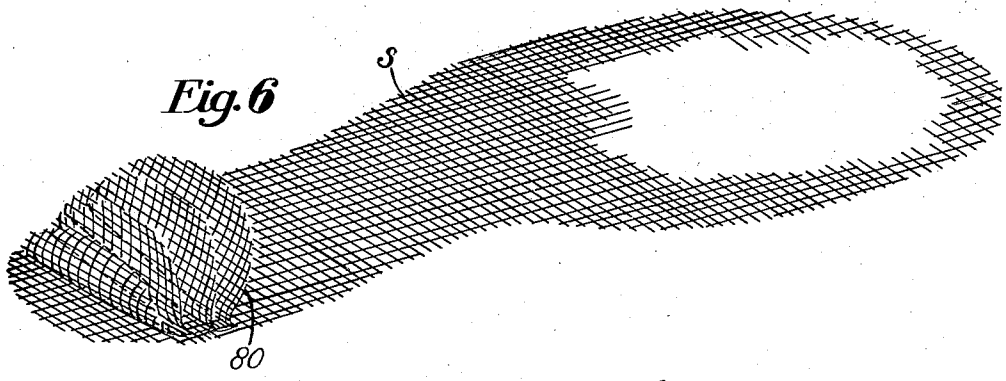
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Fig. 6



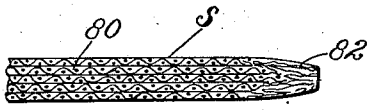


Fig. 7

Fig. 8

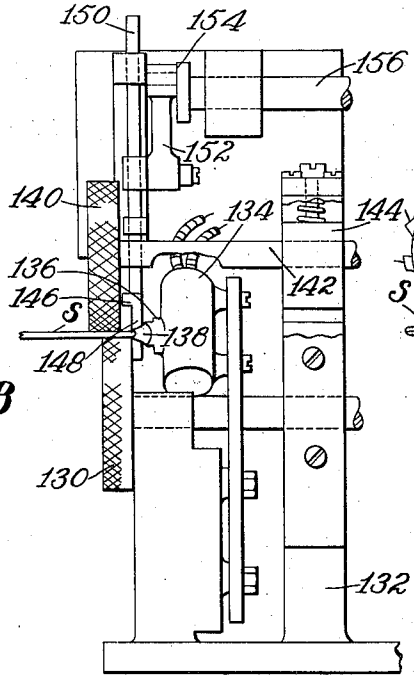
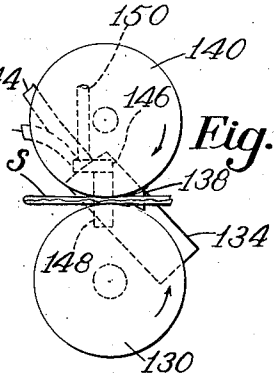


Fig. 9



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2,466,802

EDGE TREATING MACHINE

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Application December 30, 1944, Serial No. 570,730

3 Claims. (Cl. 154—42)

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This invention relates to a machine for uniting the superposed edges of multi-layer plastic materials and is illustrated herein as embodied in a machine for smoothing and securing together the edges of superposed layers of plastic screening.

For use in shoes which are to be employed in climates where there are extremes of temperature, either of heat or cold, it is desired to provide loose or slip soles which may be worn inside the shoe and which will serve to insulate the foot from the bottom of the shoe itself. Beneficial effects are obtained when such a slip sole is employed in tropical climates because of the added ventilation, the insulation against heat, and the possibility of taking up excessive perspiration. It is found in connection with shoes made for soldiers, for example, that it is highly desirable to have such slip soles which can be removed, cleaned and dried, and it has been found that a screening having a mesh comparable to that used in ordinary fly screens and which is made from filaments of plastic material, such, for example, as the one having the trade name of "Saran," is very suitable for such slip soles for the reason that it is pliable, absorbent, light and readily cleaned. To be effective, such soles must be made up of a plurality of layers, and five layers are frequently employed. The cutting of sole-shaped pieces from such screening will, as will be obvious, leave ragged edges having projecting filaments which are undesirable in the finished article and which must be bound together in some way to make the sole serviceable. It has been proposed to apply binding to the edge of the soles, but this involves an added cost of material and is not entirely satisfactory. On the other hand, if the plastic material is softened and then compacted so as to secure together the various layers, a smooth edge is provided for the sole and a strong unitary article involving only one kind of material results.

One important object of our invention is to provide an improved machine for treating the edges of such multi-layer plastic materials, to unite them as by fusing.

An important feature of the invention resides in the employment of compacting means, such as a vibratory hammer acting upon the softened edges of the work to consolidate them and which has a depending neck against which the softened edge of the work rests and by which it will be rubbed to smooth it while at the same time the neck serves as a gage for guiding the edge of the work past the heat-applying means.

These and other features of the invention will

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best be understood from consideration of the following description taken in connection with the accompanying drawings, in which

Fig. 1 is a front elevation of the machine, with a portion of the table broken away to expose the hammer and anvil;

Fig. 2 is a vertical section, on the line II—II of Fig. 1, but on a larger scale, to show the presser-foot slide;

Fig. 3 is a plan view of the operating tools of the machine;

Fig. 4 is a fragmentary plan view, looking down on the hammer and the anvil;

Fig. 5 is a horizontal section on the line V—V of Fig. 2, through the presser-foot slide;

Fig. 6 is an angular view of a slip sole cut from the multi-layer material;

Fig. 7 is a fragmentary section through the periphery of a finished sole, greatly enlarged, to show the consolidated edge thereof;

Fig. 8 is a front elevation of a modified form of the invention; and

Fig. 9 is a side elevation of the work-engaging parts thereof.

The machine has a base (not shown) from which there projects laterally an arm 10 to support a work table 12 and from which there also projects an overhanging hollow arm 14 to support a presser mechanism. It embodies a frame and driving mechanism of the type illustrated in Letters Patent of the United States No. 1,702,598, granted February 19, 1929, upon the application of P. R. Glass, to which reference may be made for a disclosure of parts not herein fully shown and described.

In treating a piece of work in the form of a sole S, successive portions of the periphery thereof are presented to a source of heat which in one form herein illustrated is provided by a blast of hot air issuing from a nozzle 20 supported indirectly by an arm 22 attached by screws 24 to the work table 12 in a position outside the bounds of the work. Carried on this arm and supported by means of clamps 26 and a rod 28 is a mixing chamber 30 to which air is supplied through a pipe 32, and illuminating gas is supplied through a pipe 34, the quantities of each being controlled by hand cocks 48. This mixing chamber is connected to a tubular combustion chamber 36 by a pipe 38. On the chamber there is sleeved a door 40 held against endwise movement by collars 42. This door is manually rotatable by a handle 44 to cause an opening 45 (Fig. 3) therein to register with a similar opening (Fig. 1) in the chamber wall so that the gas may be ignited. From the

combustion chamber the hot fluid goes directly to the nozzle 20, having been heated to the temperature required to soften the plastic material of a sole S to a welding temperature which, however, is below the thermal decomposition point. A sheet-metal guard 50 having an upstanding portion 52 prevents accidental contact with the heated nozzle.

Progressive movement of the work past this heating device is effected by a hammer and anvil feed mechanism of the type illustrated in the patent and comprising an anvil 60 carried by an arm 62 mounted on a rocking sleeve 64. The axis of this sleeve 64 is at right angles to the edge of the work at the zone of contact of the tools therewith and hence is also at right angles to the direction of feed. The upper surface of the anvil 60 is provided with grooves 65 (Fig. 4) extending in the direction of movement of the work for a purpose which will later appear. A hammer 66 cooperating with the anvil to grip the work is mounted on the upper end of an arm 68 integral with a pivot stud 70 journaled in the rocking arm 62. This stud is parallel to the edge of the work at the zone of contact therewith and hence to the direction of feed. The hammer-carrying arm 68 has a downward extension 72 clamped on the pivot stud 70 and to the lower end of this extension is attached a reciprocatory rod 74 extending from the operating mechanism by which a four-motion feed is imparted to the work in a direction away from the operator and substantially parallel to the grooves 65 (Fig. 4) through timed reciprocations of the rod 74 and oscillations of the sleeve 64. In other words, when the rod 74 is moved to the right in Fig. 1, the hammer 66 will grip the sole S against the anvil 60 and then the sleeve 64 will be rocked to carry the gripped work forwardly for a small fraction of an inch, after which the rod 74 will move to the left to release the work, and the rocking sleeve 64 will be swung back toward the observer ready for another feed cycle.

It will be observed that the under face of the hammer 66 is provided with grooves parallel to those in the upper face of the anvil in order that any tendency of the oscillatory hammer to push the work laterally away from itself will be resisted. The hammer is also provided with a depending neck 76 having an arcuate surface 78 concentric with the axis of the pivot stud 70 and against which the periphery of the work is rested to guide the work and to assist in smoothing the peripheral edges which have been softened by the action of the heat. At the same time, the pounding action of the hammer effects a consolidation of the softened edge, causing the superposed layers 80 (Fig. 6) of the plastic screening to be united in a common edge portion 82 (Fig. 7). The anvil 60 is notched at 84 (Fig. 4) to receive the depending neck 76 of the hammer, and by making a close fit between the two there will be no chance for threads of screening to be pushed down into the notch and caught there. Surrounding the anvil 60 is a removable work plate 86 to facilitate access to the hammer and anvil mechanism.

A presser foot 90 spring-pressed against the upper surface of the sole S serves to compact the layers of material prior to the action of the heat upon the peripheral edges thereof. This presser foot is intermittently lifted in a manner, to be explained, during the forward feed of the work and then again grips the work to hold it during the lifting of the hammer, the return movement thereof, and its downward movement to grip the work again. A support for this presser foot mechanism is provided by a forked bracket 92 (Fig. 3) having a hollow stem 94 which is clamped in the split outer end of the arm 14 by a pinch bolt 96 passing through lugs (not shown) on the arm. Upon releasing this pinch bolt, in-and-out adjustment of this hollow stem 94 is effected by a screw 98 (Fig. 1), while tilting adjustment of the forked bracket 92 and the stem about the axis of the stem is effected by adjusting the set screws 100. Supported in the forked bracket is a pivot pin 102 and, on this, there is carried an arm 104 which is held in adjusted position by set screws 105 and 107 engaging the bracket. On the arm 104 is a U-shaped upright casing 106 which provides a support for a square slide 108 in which the presser foot is yieldably mounted. Screws 109 entering a boss 111 on the casing attach it to the arm. The slide 108 has a cylindrical recess to receive an upstanding stem 110 on the presser foot 90 and is slotted at 112 in a boss 113 to receive a transverse retaining pin 115 carried by the stem. Above the stem 110 of the presser foot and within the slide 108 is a compression spring 114 urging the presser foot stem downwardly, within the limits of the slot 112, under a force regulated by an abutment screw 116 threaded in the slide 108. In order that the pressure on the foot 90 may be relieved at the desired intervals, a bell crank 118 is mounted on the pivot pin 102 and has a horizontal arm connected by a pitman 120 to another boss 121 (Fig. 3) on the slide 108. The slide of this arm of the bell crank lies flush with the edges of the casing 106 (Fig. 3) and holds the slide 108 therein. The upright arm of the bell crank is joined to the head 121 (Fig. 3) of a rod 122 which, in the machine of the above-mentioned patent, is utilized for the operation of a snipping knife and is therein numbered 143.

In the modified form of the invention shown in Fig. 8, a driven lower feed roll 130 is journaled in a frame 132 on which there is supported a heat-supplying member 134 containing an electric unit and provided with a lug 136 having a grooved face 138 to coact with the superposed edges of the plural layers of the work S. Above this feed roll 130 is another driven feed roll 140 carried by a shaft 142 which is journaled in a spring-pressed block 144. It will be noted that the upper roll 140 is offset to the left with respect to the lower roll, this providing space for a hammer 146 having a depending neck 148 to contact the edge of work supported on the lower roll 130 which serves also as an anvil. This hammer is supported on a rod 150 which is guided in the frame for vertical reciprocation under the impulse of a pitman 152 driven by a crank 154 on a power-operated shaft 156. It serves to consolidate the softened edges of the layers compacted and fed forward by the rolls 130, 140.

In the operation of the machine, a stack of layers 80 assembled with their broad faces in contact and which have been previously cut to a sole-shaped design are presented beneath the presser foot of the machine and introduced between the hammer and anvil until the edge rests against the arcuate surface 78 upon the neck of the hammer. The blast of hot fluid issuing from the nozzle 20 will then soften the plastic material, the layers of which will be first compacted by the action of the presser foot 90 and then will be consolidated by the action of the hammer to form a homogeneous joint along the edges of the sheets as the work is fed along by the four-motion feed offered by the hammer and anvil.

As the edge of the work is rubbed by the neck of the hammer, it will tend to smooth off melted edge portions and, by using this neck as a gage, the work may readily be guided past the nozzle at a uniform distance therefrom. When the modified arrangement illustrated in Figs. 8 and 9 is employed, the action of the hammer 146 and its neck 148 will be comparable to that shown in Fig. 1 but, as will be understood, the feeding of the work will be effected entirely by the superposed feed rolls 130, 140. In this modified arrangement, the heat is not applied by a blast of fluid issuing from a nozzle but is derived from contact with the grooved surface 138 of the lug 136 to which heat is supplied by an enclosed electric unit.

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

1. In a machine for smoothing the edge of plastic work materials, a work support, means for applying heat to the peripheral edge of the work to soften it, and intermittently operable compacting means comprising a hammer movable into engagement with the upper margin of the work, said hammer having a depending neck adjacent to the work-engaging surface of the hammer and against which the softened edge of the work is pressed to guide and smooth it.

2. In a machine for fusing the superposed edges of multi-layer plastic screen materials, a work support, an anvil positioned for oscillatory feeding movement beneath an opening in the work support, said anvil being notched, a hammer mounted for movement toward and away from the anvil and forwardly with it to feed the work, means for heating the peripheral edges of the work layers prior to their engagement by the hammer, and a depending neck upon the hammer movable through the notch in the anvil, said neck serving as an abutment against which the edge of the work may be pressed to guide it as it is fed through the machine.

3. In a machine for consolidating the superposed edges of multi-layer plastic screen material, a heating device past which the peripheral edges of the work layers are moved to soften the material, and means for consolidating the softened material, comprising an anvil beneath the work and a hammer overlying the work and movable toward and away from the anvil, said hammer having a depending neck closely fitting against the adjacent edge of the anvil to prevent fibers of the material from being pinched between them, and serving as a guide for the periphery of the work.

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LEO N. ISAACSON.

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