May 13, 1941. W. F. GOWDY 2,241,813

APPARATUS FOR MAKING EDGE BEADS ON SHEET RUBBER

Filed June 7, 1939

Fig. 1

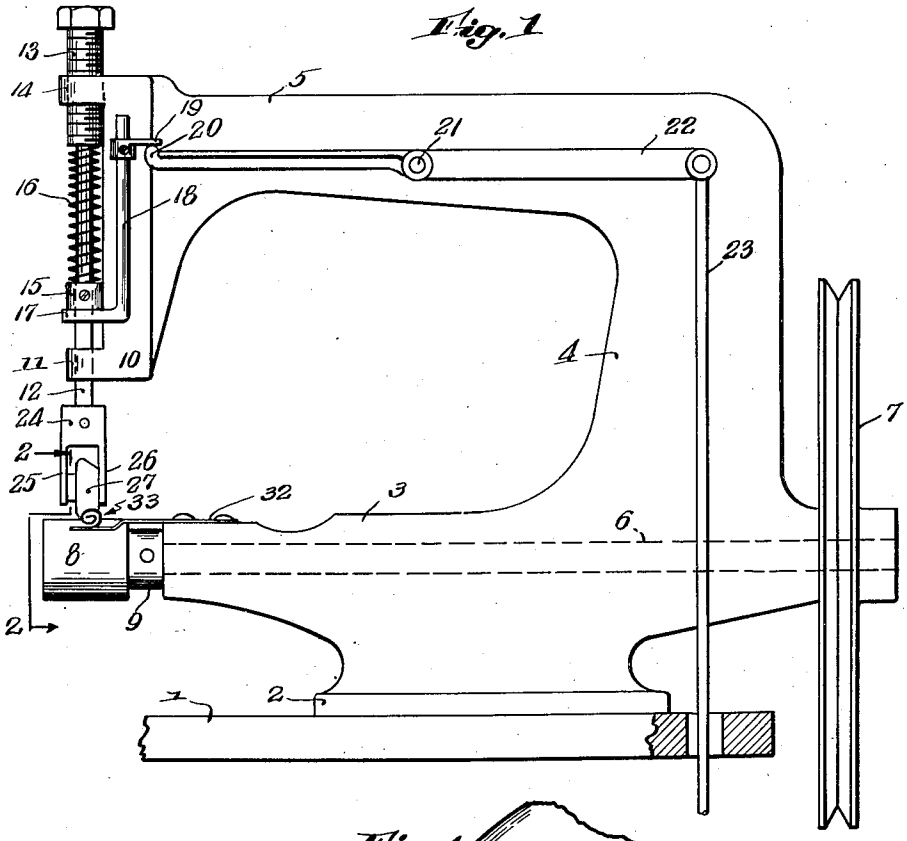


Fig. 4

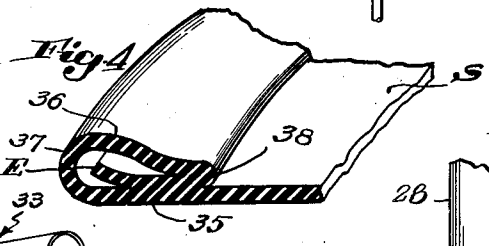


Fig. 2

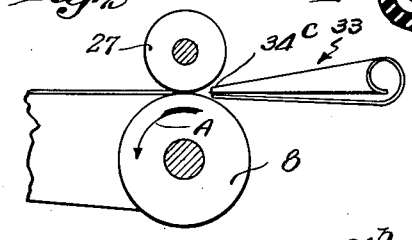


Fig. 3

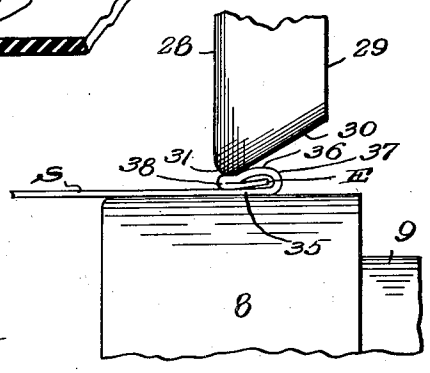
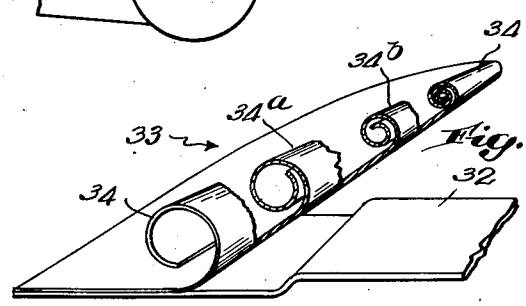


Fig. 5



Inventor:
William F. Gowdy
by Roberts Cushman & Woodberry
his Attys

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2,241,813

APPARATUS FOR MAKING EDGE BEADS ON SHEET RUBBER

William F. Gowdy, Milford, Mass., assignor to Archer Rubber Company, Milford, Mass., a corporation of Massachusetts

Application June 7, 1939, Serial No. 277,838

8 Claims. (Cl. 18—9)

This invention pertains to the manufacture of rubber goods from sheet rubber, in particular to the production of articles such as garments, including rain capes, bathing suits or caps, underwear, aprons, baby pants, etc., as well as piece goods, table covers, bags or the like, and relates more especially to a novel apparatus used in forming a marginal finish for the edge of the sheet material.

In my copending application for Letters Patent, Serial No. 277,837, filed June 7, 1939, an improved marginal finish or edge bead for sheet rubber is disclosed, together with a novel method of making it. The present invention has for its object the provision of simple and efficient apparatus useful in performing said method and in forming the improved edge bead so expeditiously that it may be made at a very low cost.

In the accompanying drawing wherein one desirable embodiment of the invention is illustrated by way of example,

Fig. 1 is a fragmentary elevation of a machine embodying the present invention, certain parts being in section and certain parts being omitted;

Fig. 2 is a fragmentary diagrammatic section substantially on the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary elevation, to large scale, showing the work-supporting and pressure-applying rolls in their operative relation;

Fig. 4 is a fragmentary perspective, to larger scale, showing the work in transverse vertical section and illustrating how the bead-forming material is integrated by the rolls; and

Fig. 5 is a fragmentary perspective view illustrating a scroll device designed to curl the marginal portion of the material and to direct it toward the rolls.

Referring to the drawing, the numeral 1 designates a suitable support, for example a table or bench, upon which the machine may conveniently be mounted. The machine, as illustrated, has a frame, which may be an integral casting, comprising the base 2 which rests upon and may be bolted to the support 1. The frame also includes the lower, substantially horizontal arm 3, the upright member or post 4, and the upper overhanging horizontal arm 5.

The drive shaft 6 is mounted in suitable bearings in the lower part of the frame and is furnished at its right-hand end (as viewed in Fig. 1) with a grooved drive pulley 7 designed to receive a belt by means of which the shaft is driven. At its left-hand end, beyond the left-hand end of the arm 3, the shaft 6 carries a work-supporting and feeding roll 8. This roll has a hub 9 concentric with the shaft 6 and which is secured to the latter in any desired manner, as for example by a key or set screw. Preferably this work-feeding and supporting roll 8 is a plain cylinder. As an instance of desirable dimensions, this roll may be one inch in length and one inch in diameter.

The upper arm 5 is provided at its left-hand end with a vertically elongate head 10 provided at its lower part with a bracket 11 in which is a vertical guideway for a vertically movable rod 12. The head is also furnished with a bracket 14 near its upper end which has an internally screw-threaded opening for the reception of the adjusting screw 13. The lower part of this screw 13 is hollow and provides an elongate socket bearing in which the upper end of the rod 12 may slide. A collar 15, secured to the rod 12 above the bracket 11, constitutes a lower abutment for one end of a coil spring 16 which encircles the rod 12 and whose upper end bears against the lower end of the screw 13. The spring 16 thus tends to move the rod 12 downwardly, and the downward pressure may be varied by turning the screw 13.

Just below the collar 15 a lifter member 17 is arranged to embrace the rod 12, such lifter having the vertically extending portion 18 provided near its upper end with the laterally directed lug 19 which overlies an upwardly turned toe 20 at the left-hand end of a lever, pivoted on a stud 21 projecting forwardly from the upper arm of the frame, whose right-hand arm 22 is pivotally connected to the upper end of a link 23 which reaches down through an opening in the support 1 and which is connected at its lower end to a suitable foot treadle (not shown).

A roll holder 24, fixedly secured to the lower end of the rod 12, is furnished with a pair of spaced, parallel and substantially vertical legs 25 and 26 which provide bearings for a shaft carrying the upper pressure-applying roller or presser-foot 27. This pressure-applying roller or rotary presser-foot turns on an axis parallel to that of the work-supporting roll 8, and in order to maintain the parallel relation of the axes of the rolls, the rod 12 may be a square rod sliding in a square opening in the bracket 11, or if the rod 12 be of circular section, a suitable key or the like may be provided to prevent it from turning in the bracket.

This pressure-applying roll 27, as illustrated, comprises a substantially plane radial face 28, a parallel radial face 29, and a beveled or lined peripheral face 30, the latter making an acute angle with the plane of the face 28, merging with

the latter face by means of the curved edge surface 31. As an instance of desirable dimensions for this pressure-applying roll, its maximum diameter may be of the order of ⅝ inch, the face 29 may be ⅜ of an inch in diameter, the distance between the bases 28 and 29 may be $\frac{7}{32}$ of an inch, the angle between the faces 30 and 28 may be 60°, and the radius of curvature of the edge 31 may be $\frac{1}{32}$ inch—the faces 28 and 30 both being tangent to the arc forming this edge.

While certain desirable dimensions for the rolls 8 and 27 have been given, it is to be understood that these are merely by way of illustration and as indicative of an arrangement which has been found in practice to be highly useful, but the invention is not to be limited to these particular dimensional relationships.

A plate 32 is secured to the upper surface of the arm 3 of the frame near the left-hand end of said arm and this plate supports the scroll device 33. This scroll device is preferably of sheet metal and is secured to the supporting plate 32 in any desired way, for example, by rivets or spot welding. The scroll device has an elongate, substantially conical portion formed by curling the metal of which it is made, the metal being progressively curled to a greater degree from its larger end toward its smaller or delivery end. Thus, as indicated in Fig. 5, the metal at the larger end 34 of the scroll makes only a part turn, but at successive points, indicated at 34ª, 34ᵇ and 34ᶜ, it becomes more and more curled in such a way that sheet material fed into the large end of the scroll is gradually rolled on itself until, when it emerges from the small end of the scroll, its edge has been turned through 360°. As illustrated in Fig. 2, the small or delivery end 34ᶜ of the scroll is disposed in such a way relative to the rolls 27 and 8 that the curled-over sheet material is delivered directly into the bite of the rolls.

As illustrated in Figs. 3 and 4, the marginal portion of the sheet material is so curled over or turned by the action of the scroll device that the raw edge E of the sheet material S is directed outwardly and disposed between upper and lower plies 36 and 35 of the sheet material so that the raw edge is wholly concealed between these plies. At the same time the outer exposed edge of the material is smoothly rounded as indicated at 37. The delivery end 34ᶜ of the scroll is so disposed transversely of the feed roll 8 that the curved edge 31 of the roll bears upon the folded-over material at a point substantially spaced from the rounded outer edge 37 and preferably close to the inner edge 38 of the folded material where there are at least three superposed plies. The pressure of the roll 27 exerted upon the uncured rubber causes the upper and lower plies to become integrally merged and united, although the material close to the outer edge 37 is left substantially uncompressed so that it forms a well rounded and bead-like edge.

The roll 8 is positively driven in the direction of the arrow A (Fig. 2) so as to draw the material through the scroll and to feed it between the rolls, and the speed of the roll 8 may be determined to suit the ability of the operator manipulating the work. With this arrangement it has been found possible to form beaded edges upon sheet rubber with such rapidity that this method of providing a finish becomes wholly practical even when making garments or other articles which must be sold at a very low price but which have margins of substantial extent which must be finished. The completed edge finish or bead is quite elastic since it need not include any elements other than the sheet rubber itself, and, since it is unnecessary to use any adhesive or the like in forming the finish, no such difficulties are experienced in operating the machine as commonly occur when adhesives of any nature must be applied.

While a desirable embodiment of the invention has been illustrated by way of example, it is to be understood that the invention is not limited to this precise arrangement but is to be regarded as broadly inclusive of any construction embodying the same principle and which falls within the scope of the appended claims.

I claim:

1. Apparatus for use in forming a finish bead at the edge of uncured sheet rubber, said apparatus comprising a work support, a pressure-applying roll bodily movable toward and from the work support, and work-presenting means operative progressively to fold in the raw edge of the sheet material and form at least three plies thereof and to present the margin of the material, with its edge inturned, between the support and roll thereby to be compressed and flattened.

2. Apparatus for use in forming a bead at the edge of uncured rubber, said apparatus comprising a driven roll constituting a work support, a pressure-applying element movable toward and from the work support, and a fixed scroll operative progressively to curl the margin of the material so as to conceal its raw edge between plies thereof and to guide said plies and interposed edge of the marginal material between the roll and pressure-applying element.

3. Apparatus for use in forming a bead at the edge of uncured rubber, said apparatus comprising a driven roll constituting a work support, a pressure-applying roll movable bodily toward and from the work supporting roll and having its axis substantially parallel to that of the work-supporting roll, and a stationary scroll operative progressively to curl the margin of the sheet material and to deliver at least three plies of the marginal material into the bite of the rolls.

4. Apparatus for use in forming a bead at the edge of uncured rubber, said apparatus comprising a driven roll constituting a work support, a pressure-applying roll having its axis substantially parallel to that of the work-supporting roll, means supporting the pressure-applying roll for bodily movement toward and from the work-supporting roll, means yieldably urging the pressure-applying roll toward the work-supporting roll, and means operative progressively to curl the margin of the sheet material and to deliver at least three plies of the marginal material into the bite of the rolls.

5. Apparatus for use in forming a bead at the edge of uncured rubber, said apparatus comprising a driven roll constituting a work support, the work-supporting roll being substantially cylindrical, a pressure-applying roll having its axis substantially parallel to that of the work-supporting roll, said pressure-applying roll having a radial end face, a peripheral face making an acute angle with said end face, and an arcuate edge face to which said radial and peripheral faces are tangent, and means operative to curl the marginal portion of the sheet material and to direct at least three plies of the marginal material between the rolls in such a position that the arcuate edge of the pressure-applying roll engages the curled marginal material at a point

spaced inwardly from the exposed outer edge of the latter.

6. Apparatus of the class described comprising a pair of cooperating rolls for integrating superposed plies of uncured rubber, and means operative progressively to curl the margin of the sheet material through an angle of at least 360° so that its raw edge is disposed between and concealed by superposed plies of the sheet material, one of said rolls having an arcuate contact surface of small radius designed and arranged to exert pressure upon at least three plies of the marginal material inwardly of its outer exposed edge.

7. Apparatus of the class described comprising a pair of cooperating rolls for integrating superposed plies of uncured rubber, and a scroll device operative progressively to curl the margin of the sheet material through an agle of at least 360° so that the raw edge is disposed between superposed plies of the sheet material, one of the rolls being so designed and arranged as to engage and exert pressure upon at least three plies of the marginal material only along a line which is spaced inwardly from the exposed outer edge of the curled marginal material.

8. Apparatus of the class described comprising a pair of cooperating rolls for integrating superposed plies of uncured rubber, and a scroll device operative by engagement with the margin of the sheet material, as the latter is advanced by the rolls, progressively to curl the margin through an angle of 360° thereby to dispose the raw edge between two integrally joined plies of the material, one of the rolls having a work-engaging edge which contacts the curled marginal material at a point spaced from its outer edge and where at least three plies of the material are interposed between the rolls.

WILLIAM F. GOWDY.