

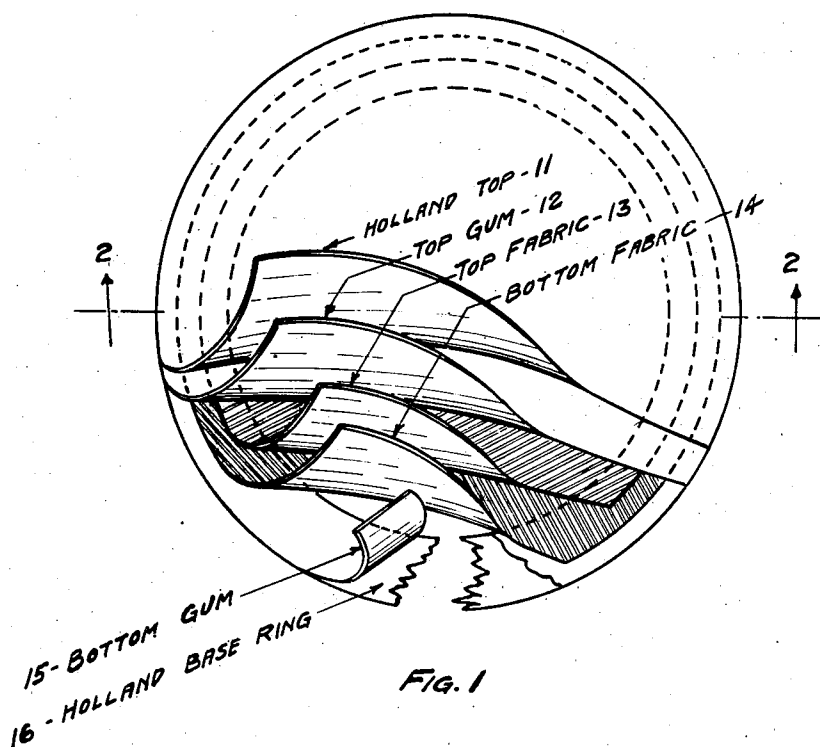
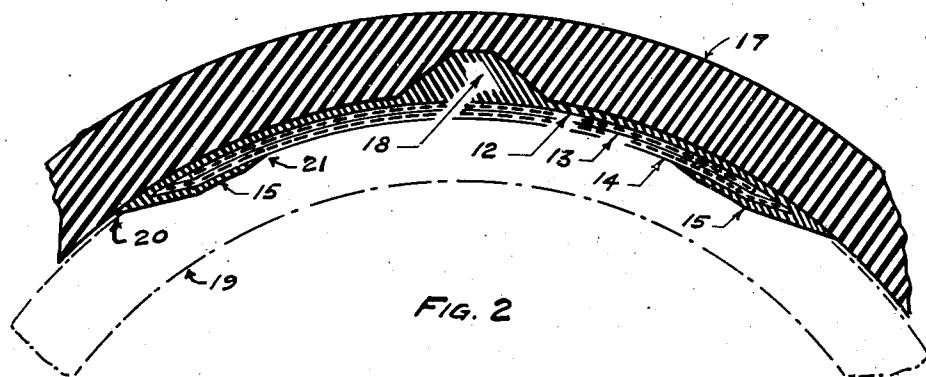
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VULCANIZABLE PATCH

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VULCANIZABLE PATCH

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This invention comprises a new and improved type of preformed patch of the vulcanizable type particularly adapted to be utilized in the repairing of ruptures in casings for automobile tires.

5 The subject patch may be used for repairing a variety of articles other than casings and tubes for automobile tires, and while the former use has been selected as a specific embodiment and illustration of the utility of the invention it is not so stated as a limitation.

10 In the art of repairing conventional casings where the injury is confined to a local breaking away of the fabric plies, not so extensive as to require the cutting away of a considerable area of the damaged structure and replacing the same by a sectional repair, it is the practice to apply some form of local patching material adapted to adhere tenaciously to the area covered thereby. This class of patching may be practiced by cutting patch stock to fit the local condition found, or, more expediently, to select the proper size and shape of a preformed and fully prepared patch for the purpose.

20 The two usual types of preformed patches are, first; the self-vulcanizing style which is merely applied in an appropriate way to the ruptured surface and the gum coating thereafter vulcanizes of its own inherent properties without the application of the usual heat treatment and, second; the patch coated with unvulcanized but vulcanizable gum which requires the use of a repair vulcanizer properly to affix it by local pressure and heat.

25 This class of preformed patch, at least conventionally, consists of a plurality of rubberized and semi-cured plies of fabric coated with an attaching layer of gum which is protected up to the time of use by a web of thin material, such as Holland. It is the usual practice to trim the edges of the largest ply of fabric sheer and even with the margin of the outer gum coating, whereby, when the patch is applied with gum and fabric margins exposed and even, there exists an excessively deep marginal stepoff. The soft outer gum coating being next to the surface under repair and the relatively harsh strength ply of fabric being on the reverse and exposed surface it is apparent that an inner tube, compressed and subject to a creeping movement against the raw and unprotected marginal edge of the exposed harsh fabric, will tend both to chafe and weaken the tube and, by creepage, induce a scuffing and loosening action along the patch margin. This combined evil is a decided disadvantage where such patches are used.

Due to the advantage in effecting these minor repairs expeditiously the practice of cutting and fitting repair patch material by hand to suit each job is found to consume too much time. It is now generally found more economical and decidedly faster for repairmen to work with preformed patches supplied by the factory in a variety of sizes and shapes to fit various jobs; and it is to supply this demand with an improved type of patch to which this invention is directed.

Being cognizant of the defects of the conventional patches, this invention is directed to the production of a preformed patch of an improved form possessing the several advantages more particularly set forth herein and illustrated in the accompanying drawing, in which:

Figure 1 is a top view, partially broken away to show details, of a preferred form of the invention.

Figure 2 is an enlarged cross-sectional view through the diameter (2—2) of Figure 1, showing a typical application of the patch to repair a small rupture in a tire casing. A fragmental cross-section of a casing also is shown, and a fragmental section of a typical pressure bag compressing the patch against the inner surface of the casing is indicated in broken lines.

30 The specific patch shown (see Figure 1) comprises two plies of conventional cord fabric, rubberized, semi- or partially-cured and assembled in such manner that the larger bottom fabric 14 shall show a marginal projection beyond the smaller top fabric 13. The term "top" as used denotes the direction of fixation to a surface under repair. As shown in Figure 1, these plies preferably are arranged with their cords in crossed relation. Completely overlaying the top 13 is a layer of unvulcanized but vulcanizable gum 12 of such size that its margin projects beyond the margins of both 13 and 14, and this soft gum is protected until use by a Holland top 11. Below fabric 14 is placed a layer of unvulcanized but vulcanizable gum of such size that its outer margin projects beyond the margin of 14, preferably coinciding with the marginal dimension of top gum 12. Such gum preferably extends inwardly a sufficient distance to afford adequate reinforcement to the relatively thin tapered marginal portion of the patch, after vulcanization. This layer may, if desired, be in the form of a ring such as 15, which as shown in the drawing, extends inwardly past the marginal single ply portion of composite insertion 13 and 14. These layers of gum are adapted to form an envelope or sheath encasing and projecting out-

wardly beyond the marginal edges of the rubberized cord fabric body. Bottom gum 15 also is temporarily covered by a protective sheet, such as, for example, ring 16 of Holland.

5 The cross-sectional view, Figure 2, in diagram, illustrates one form of this patch in process of fixation to repair a break in a tire casing. The casing 17 is damaged at 18 and the area has been packed with a suitable vulcanizable gum shown
10 as merged with the top gum 12, from which the Holland 11 has been removed. The conventional repair air bag 19 is shown in broken lines as it becomes compressed against the bottom of the patch in the process of vulcanization. With the
15 parts in this position, the patch is subjected to a vulcanizing operation, and as this operation proceeds, the partially-cured insertions, the vulcanizable gum outer layers, and the backing gum at 18, all will be vulcanized. The union thus
20 formed between layer 12 of the patch and the tire casing, and among the several layers of the patch, is extremely firm and intimate, so that there will be formed what, in effect, may be regarded as a substantially homogeneous mass of
25 vulcanized rubber encasing the plies of cord fabric. The patch formed in this manner possesses exceptional strength, and is admirably suited to give long and satisfactory service-life.

Figure 2 is intended to show the progressive
30 unifying of the margins of gums 12 and 15 as the material flows and becomes molded during the heat of vulcanization under the squeeze of the bag 19. It is apparent that the marginal extremities of 12 and 15, being free flowing gum and unconfined, will unify and work into a fine
35 bevel edge 20 as vulcanization progresses, avoiding any perceptible abruptness at this point. Also, the inner edge of the gum ring 15 at 21 will become attenuated and practically merge
40 with the exposed face of the bottom fabric 14.

The abruptness illustrated in Figure 2, at the margins, merely shows relative changes in contour as the patch under vulcanization assumes its approximate final form. The enveloping action
45 of the marginal gum with respect to the raw edges of the fabric plies is thus disclosed, and it will be understood that the degree of these changes as finally realized does not constitute a limitation. When the patch is finally worked
50 to form against the repair area the inner face and marginal portions become so closely conformed with the objective surfaces that all abruptness is lost and the final job presents a condition that will fully eliminate all edge friction
55 and danger of scuffing up of the effectively guarded fabric margins.

It is understood that the condition shown in Figure 2 and described implies the application of any conventional or desired repair vulcanizing
60 appliances which are not illustrated.

While the typical example for this patch relates specifically to that requiring vulcanization for applying it is apparent that the invention includes the self-vulcanizing style embodying the novel features disclosed. Figure 2 could as well
65 illustrate the working into place of a self-vulcanizing patch wherein numeral 19 would become the usual inner tube. Where the term "unvulcanized" is used without qualification the substance may be either unvulcanized self-vulcanizing or unvulcanized vulcanizable stock.
70

In applying the patch the usual preparation of the injured surface is implied, and the Holland protector sheets are removed.

Since certain changes may be made in the

above product and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted
5 as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the
10 invention which, as a matter of language, might be said to fall therebetween.

Having described a preferred form of this invention, and reserving all variations that may come within the scope thereof, what we claim is:
15

1. A patch comprising a semi-cured body of strength insertion; a gum coating overlaying one surface thereof and marginally projecting therebeyond; and a marginal gum coating strip binding
20 along the outer edge of the opposed surface of said body and marginally projecting therebeyond.

2. A patch comprising, in combination, an assembled composite structure including, multiple ply vulcanizable strength insertions; a vulcanizable top cover of sheet gum marginally overlapping said insertions; a ring element of vulcanizable gum marginally overlapping edges of said insertion on the surface opposed to that overlaid by the top cover, whereby in vulcanization to an objective surface the said insertion edges are completely
25 enveloped by said gum elements.

3. A patch comprising, in combination, a partially-cured body of strength insertion, a gum coating overlaying one surface thereof and marginally projecting therebeyond, and an additional gum coating on the opposite surface of said body and extending outwardly and inwardly from the edges thereof.
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4. A patch comprising, in combination, a body formed of partially-cured rubberized cord fabric, and an envelope of vulcanizable gum, covering at least one side and encasing and projecting outwardly beyond the margin of said body.
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5. A patch comprising, in combination, a vulcanizable body having sufficient strength adequately to reinforce a damaged tire casing, and an envelope of plastic, vulcanizable gum covering at least one side and encasing the entire margin of said body, said gum being present at the margin in sufficient quantity to flow under pressure
45 to form a tapered gum margin merging without substantial abruptness into the surface to which the patch is affixed.

6. A patch comprising, in combination, a body formed of a plurality of plies of rubberized cord fabric so disposed and arranged that fewer plies are present at the margin than at the central portion of said body, a layer of vulcanizable gum extending over one side of said body and projecting marginally therebeyond, and a layer
50 of protecting material on the opposite side of said body and projecting marginally therebeyond, the marginally projecting portions of said gum and said protecting material meeting to encase the edges of said plies.
55

7. In a patch, the combination including a body formed of a plurality of plies of partially-cured rubberized cord fabric so disposed and arranged that fewer plies are present at the margin than at the central portion of said body, and a layer
60 of vulcanizable gum extending over one side of said body and projecting marginally therebeyond, and means on the other side of the body cooperating with said layer to encase the edges of said plies.
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8. In a casing patch of the character described, the combination of: a patch structure made up of ply material and providing an edge in which reinforcing is exposed; and a sealing strip placed
5 along said edge and having a portion formed to extend across said edge and cover the ends of reinforcing exposed therein.

9. A casing patch of the character described, in-

cluding: a patch structure comprising a ply member having an exposed edge; and a sealing layer of rubber material on the patch structure in a position to overlap said edge, said overlapping portion being formed to extend across said edge. 5

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