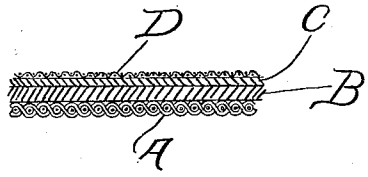
G. B. WOOD.

REPAIR PATCH.

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1,296,349. Patented Mar. 4, 1919



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REPAIR-PATCH.

1,296,349. Specification of Letters Patent. Patented Mar. 4, 1919.

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To all whom it may concern:

Be it known that I, GEORGE BENTON WOOD, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented a new and useful Improvement in Repair-Patches, of which the following is a specification.

Prior to the present invention it was the custom to repair small punctures in the inner tubes of pneumatic tires by the use of patches in the shape of disks, often with centrally arranged plugs projecting from one side. The construction of these patches was such that they were of no value in the repair of cuts or tears of appreciable length. Again, they were relatively expensive in that each patch had to be made up separately.

These objections the present invention is designed to overcome, its purpose being to provide a patch which may be made up in sheet form, and from which pieces of the proper shape and size for the repair of either a small puncture or a large tear may be cut at will, said patch being of a nature such that it can be easily and quickly applied without the use of tools, and also being capable of holding permanently without creeping, loosening or leaking and without being vulcanized. The object is further to provide a patch of the nature stated that may be applied when cold. The patch may also be used for repairing the broken fabric in casings and for other purposes.

The attempts to adapt the disk or plug patches heretofore mentioned to the repair of cuts or tears of appreciable size in inner tubes have proven to be failures, it being found that peeling or creeping is almost certain to take place, consequently it has been necessary in practice to resort to the use of vulcanizing outfits notwithstanding the expense, annoyance and loss of time incident thereto. The action of the patch in peeling or creeping away from the face of the inner tube may perhaps be better understood by considering what takes place when a flat rubber band is pulled outwardly while gripped between the thumb and forefinger; if the nails are brought tightly together on the band all movement takes place between the nails and the point at which the pulling force is applied, and is due to the elasticity of the rubber; if, on the other hand, the nails are not brought tightly together but the rubber is held by pressure exerted between the fleshy parts of the finger and thumb, there is introduced an added element of creeping or slipping of the rubber across the skin although the pressure actually exerted may be much higher than in the former instance. This creeping, it will also be observed, is also a function of the number of variations in the pulling force and of time. In the patches which have heretofore been devised, that is, those patches intended for use without vulcanizing tools, the rubber face next to the inner tube—at the edges at least—has been comparatively free to give and take with the movements of the tube, from which a tendency to creep in reference to the latter has been set up, the action being comparable to that which took place between the fleshy part of the thumb and finger and the rubber band. This creeping soon results in actual separation of the patch from the tube which, once set up, continues on account of the tendency of the friction between the patch and the inner surface of the outer casing to roll the edge of the patch away from the tube. Even a very narrow free edge is sufficient to cause the ultimate failure of the patch.

To the end of overcoming the above objections and of producing a patch which is thoroughly commercial (in that it may be manufactured at a very small cost, in that it may be applied to repair either large or small holes without the use of vulcanizing tools, and in that it affords a permanent bond with the tire) the invention consists in a tire patch formed of a sheet of fabric impregnated with a body or thin layer of rubber or gutta percha vulcanized to the fabric (said fabric being co-extensive with the body), together with a very thin sheet facing of uncured gum applied to the body portion, and a protective sheet or cover whereby the air is excluded from the gum, said cover being removed when the patch is to be applied.

This patch is made up in sheets from which pieces of proper size and shape are cut corresponding to the particular cut or tear. The pieces, while very flexible, are substantially non-elastic (as compared with rubber patches) and when applied to the outer surface of the inner tube bond therewith to the extreme outer edge of the patch, and give rise to an action analogous to the

gripping of the rubber band with the thumb or finger nail; in other words, prevent creeping, and, with it, the initial separation between the edge of the patch and the tube. The entire stress across the cut or tear may be said to pass through the patch from one edge portion of the latter to the other, thus eliminating the opportunity for the tube and patch to crawl or creep in reference to one another.

In the accompanying drawing, the figure is a section of a detail of my improved repair patch.

Referring to the drawing, my invention comprises a backing in the form of a strip or sheet of fabric A made out of heavy canvas or other suitable material, upon one surface of which is secured a body in the form of a thin sheet or coating B of rubber or gutta percha. This sheet of rubber in the form of high grade tube stock or substantially pure gutta percha is thoroughly cured by steam vulcanizing. In applying the body the fabric is first treated with gasolene, benzin, kerosene or other suitable material which will soften the rubber in condition to fill the interstices in the fabric and assist in causing the rubber to unite and adhere to the canvas and become substantially a unitary structure therewith. The means for pressing and heating these two elements may be by passing them between hot rollers or pressing them between hot plates or other suitable elements. After the canvas backing and body of rubber B have been fastened together and the rubber cured, the exposed surface of the sheet of rubber is coated with a thin layer C of uncured rubber gum of air curing quality or vulcanizing stock, and the surface of this uncured rubber is then protected from the effects of the atmosphere by securing a covering strip or sheet of thin fabric D to said surface, said fabric being removed by stripping when the repair patch is used. As a result the patch provides a medium which is strong and durable, and which is not affected by the heating of the tire, except to further cure the surface C, which is thin as compared with the thickness of the body and backing of the patch. In use the broken or perforated portion of the inner tube to be repaired is cleaned with gasolene or other suitable means and then coated with a thin layer of rubber cement. The repair patch of suitable size and shape has its covering D then stripped, and the uncured rubber side pressed firmly by hand over the cement coated portion of the tube, so as to close the opening or perforation. The tube is then reinserted in the casing in the usual manner, and the pressure exerted by inflating the tube further holds the patch in place. The body of cured rubber mounted on fabric as employed augments the strength of the patch and prevents it from breaking or loosening and the thin covering of uncured rubber acts as a binding medium to hold the patch securely in place, said medium being readily cured by the heat of the tire and causing the patch to hold permanently in place without vulcanizing.

I am aware that cement patches have been employed in which uncured rubber has been used as a body over a base or foundation made of fabric, but such structure has required vulcanizing after being placed on the tube to hold the patch in place permanently. My invention provides a permanent patch without vulcanizing on the surface of the tube. When desired the patch can be applied in a similar manner as described above to the fabric of the inner surface of outer casings to repair blow-outs and punctures.

In accordance with the patent statutes, I have described the principles of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the construction shown is only illustrative, and that the invention can be carried out by other means and applied to uses other than those above set forth within the scope of the following claims.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A repair patch for inner tubes and tires, comprising a backing of fabric, a layer of rubber placed upon said fabric, said backing being co-extensive with the rubber layer, said backing and rubber layer being vulcanized together under pressure to form a unitary structure of sufficient thickness to entirely prevent the passage of air at all pressures to which the tube is subjected, said structure being substantially non-elastic in one direction, a thin facing of uncured gum permanently adhering to the surface of the rubber layer opposite the fabric, and a protective fabric covering strip removably adhering to the surface of the gum covering, whereby, when the covering is removed, the facing of fresh uncured gum may be applied to the tube which it is desired to patch and may be retained thereon to unite the patch and tube into one unitary air-tight fabric without further vulcanization than ensues from the heating of the air in the tire in ordinary use.

2. A repair patch for inner tubes and tires comprising a layer of substantially non-elastic fabric and a layer of rubber heat pressed together to form a unitary structure of sufficient thickness to entirely prevent the passage of air at all pressures to which the tube is subjected, the fabric being co-extensive with the layer of rubber, a covering of uncured gum of air curing quality permanently adhering to the exposed surface of said rubber layer, and a protecting fabric

covering strip removably adhering to the surface of said gum covering.

3. A repair patch for inner tubes and tires, comprising a relatively thick backing of fabric, a relatively thin layer of rubber placed upon said fabric, said backing and rubber layer being vulcanized together under pressure to form a unitary structure in which the fabric is co-extensive with the rubber, said structure being of sufficient thickness to entirely prevent leakage of air therethrough at all pressures to which the tube or tire is subjected, a thin facing of uncured gum permanently adhering to the surface of the rubber layer opposite the fabric, and a protective fabric covering strip removably adhering to the surface of the gum covering, whereby, when the covering is removed, the facing of fresh uncured gum may be applied to the tube which it is desired to patch and may be retained thereon to unite the patch and tube into one unitary air-tight fabric without further vulcanization than ensues from the heating of the air in the tire in ordinary use.

4. A thin repair patch for thin fluid tight rubber articles comprising a thin sheet of fabric impregnated with rubber vulcanized thereto to form a body, said body being of thickness sufficient to prevent leakage of fluid therethrough, said fabric being co-extensive with the body whereby the body is rendered substantially non-elastic throughout, a facing of uncured gum of air-curing quality permanently adhering to one face of the body, and a removable air-tight covering for the exposed surface of the uncured gum.

5. A thin repair patch for thin fluid tight rubber articles comprising a thin sheet of fabric impregnated with rubber vulcanized thereto to form a body, said vulcanized rubber being of thickness sufficient to prevent passage of fluid therethrough under all conditions to which the patch is ordinarily subjected, said fabric being co-extensive with the body whereby the body is rendered substantially non-elastic throughout, a facing of gum permanently adhering to one face of the body and being co-extensive therewith, and a removable air tight covering for the exposed surface of the gum.

6. A repair patch for the outer surface of a tire tube comprising a sheet of fabric forming the outer surface of the patch for contact with the shoe, a sheet of vulcanized rubber contacting with the inner face of said fabric, a sheet of raw or uncured rubber adhering to the inner face of said vulcanized sheet and effectually closing the joint between the edges of said vulcanized sheet and the tube, and a removable fabric adhering to the outer surface of said raw rubber sheet, said raw rubber sheet becoming vulcanized on the tube through the heat produced by the tire shoe on the outer surface of the patch.

7. A thin sheet of tire patch material including a backing of fabric, a layer of vulcanizing rubber applied to one side of said backing and secured to the entire surface thereof by being vulcanized, and a non-vulcanized layer of vulcanizing rubber secured to said vulcanized layer.

8. A thin sheet of tire patch material including a backing of fabric, a layer of vulcanizing rubber applied to one side of said backing and secured to the entire surface thereof by being vulcanized, and a layer of unvulcanized rubber secured to said vulcanized layer.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

GEORGE BENTON WOOD.

Witnesses:
STELLA L. WASCHENBERGER,
F. G. BRADBURY.