

W. R. S. FROST.
VULCANIZING APPARATUS FOR TIRE TUBES OR COVERS.
APPLICATION FILED FEB. 6, 1909.

926,695.

Patented June 29, 1909.

2 SHEETS—SHEET 1.

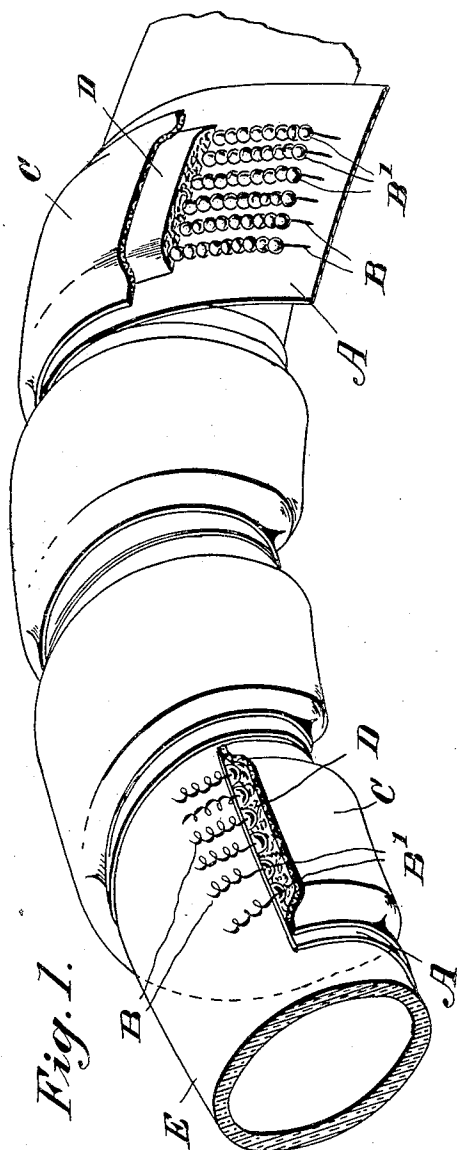


Fig. 1.

WITNESSES

Chas. K. Davies
M. H. Darg.

Fig. 2.

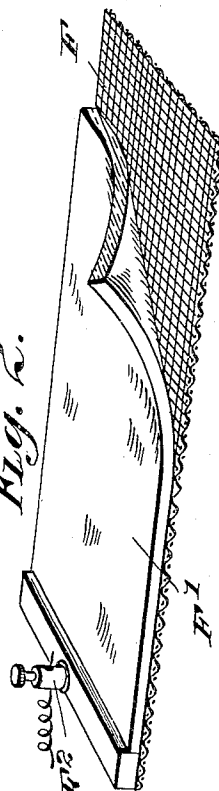
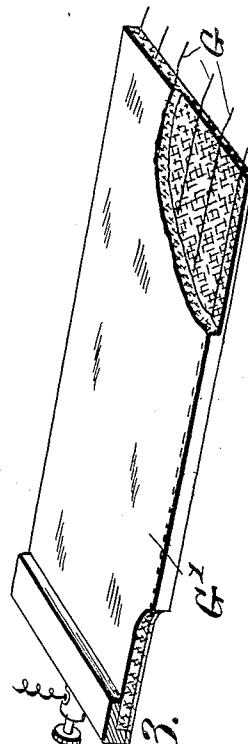


Fig. 3.



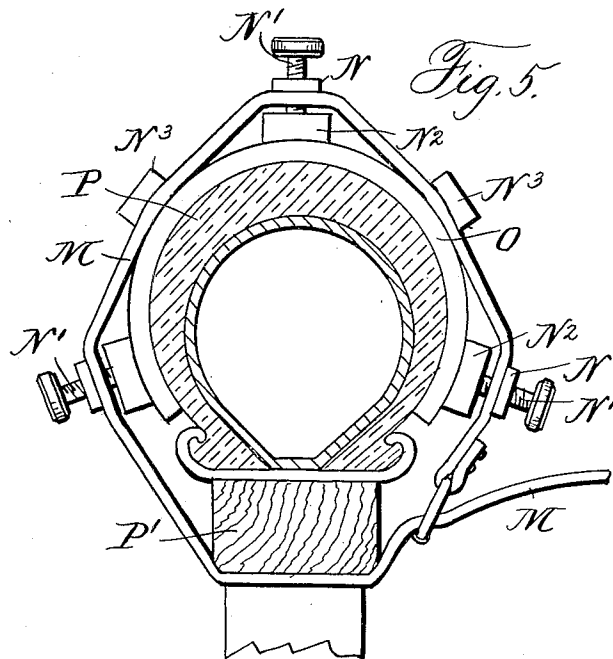
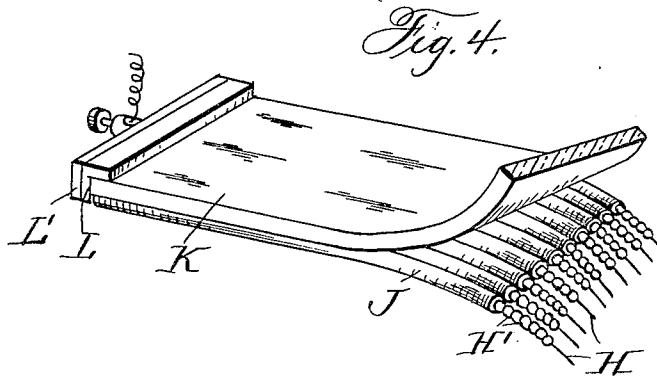
INVENTOR

William R. S. Frost
By Wm. E. Boulter Attorney

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Witnesses
M. H. Darg.
L. A. Price

Inventor
William R. S. Frost,
By Wm. E. Boulter,
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM ROBERT SALMON FROST, OF LONDON, ENGLAND.

VULCANIZING APPARATUS FOR TIRE TUBES OR COVERS.

No. 926,695.

Specification of Letters Patent.

Patented June 29, 1909.

Application filed February 6, 1909. Serial No. 476,412.

To all whom it may concern:

Be it known that I, WILLIAM ROBERT SALMON FROST, a subject of the King of England, residing at London, England, have invented certain new and useful Improvements in Vulcanizing Apparatus for Tire Tubes or Covers, of which the following is a specification.

This invention relates to vulcanizing apparatus for tire-tubes or covers and has particular reference to the apparatus of the kind in which the heat necessary for vulcanization is obtained by passing an electric current through a conductor.

According to this invention the vulcanizer is so constructed as to provide a flexible surface that adapts itself to the surface of the part under treatment. For this purpose the conductor may be flexible or arranged to cooperate with a flexible heat conducting foundation to which it gives up its heat. The apparatus is thus adapted to make intimate contact with tires of various shapes or with different parts of a tire.

According to one method of carrying out this invention the vulcanizer is made in the form of a flexible strip or band that may be wound around the tube or bent over any part of it according to the character and situation of the repair required.

In the accompanying drawings: Figure 1 is a perspective view of the vulcanizer in part section constructed according to one method of carrying out this invention; Fig. 2 is a perspective view showing a modified form; Fig. 3 is a perspective view of another modification; Fig. 4 is a perspective view of yet another modification, and Fig. 5 shows in elevation a device for applying pressure to the vulcanizer.

Like letters indicate like parts throughout the drawings.

The form of vulcanizer shown in Fig. 1 comprises a metal or other strip A that is a good conductor of heat and which forms the foundation for carrying the resistance wires B. On the wires glass or other insulating beads B' are threaded. Preferably these beads are D-shaped as shown and are placed with their flat face toward the metal foundation A whereby the wires, although insulated

from the foundation, are brought as close to the same as possible and thus readily give up their heat thereto. The wires are closed in by a cover C that may be of any suitable flexible material such as rubber or canvas and the interior space is filled with insulating material such as asbestos or a mixture of asbestos and rubber D. When rubber is employed, the whole can be vulcanized together, the filling D and cover C being thus firmly connected as one piece with the metal base A. Preferably the cover does not extend to the extreme edges of the metal base which enables one convolution of the vulcanizer to overlap that next to it when applied as shown in Fig. 1. By this means a continuous heat-conducting surface is presented to the tube E under repair. It will be understood that the vulcanizer may be made of any length according to requirements and provided with terminals connecting the wires B and affording means whereby they may be connected to a suitable source of electric current and instead of being wound around the tube as shown, it may be laid circumferentially thereon or in any other position that the repair demands. It will be seen that the metal base and in fact the whole vulcanizer provides a tape that is sufficiently strong to allow it to be tightly pulled when applying it, for the purpose of causing it to bear with the necessary pressure upon the part to be treated.

In Fig. 2 the conductor is made in the form of a gauze strip F and this is covered with material F' that may give it the requisite tensile strength and also conserve the heat. The gauze strip is connected to a terminal F² and may be made of any length, the other end being similarly provided with a terminal to receive the wires from the battery or other source of supply. With this form of vulcanizer the heated conductors may be brought into direct contact with the surface to be treated.

In Fig. 3 the conductors G are shown as woven into the fabric G'. They may be so woven as to appear on the surface if desired and in any case they are preferably disposed nearer that side which is intended to be brought into contact with the part to be

treated, than the reverse side. The object of this will be readily understood as it is desired to concentrate all the heat generated, upon the surface under treatment. The strip shown in Fig. 3 may have a metal foundation if desired on the heating side for the purpose of equalizing the heat generated by the conductors. Such a metal foundation may be in the form of a plain strip such as A (Fig. 1) or a gauze strip, and moreover a gauze strip may be employed for the construction of vulcanizer shown in Fig. 1 instead of the plain strip illustrated.

Fig. 4 shows an arrangement whereby any one conductor may be withdrawn should it become damaged and another entered in its place. For this purpose the conductors H are threaded with insulating beads H¹ and each is separately mounted in a tube J. These tubes may be made of spirals of wire and they may be secured by vulcanizing or otherwise to a backing K. The backing provides the necessary means for conserving the heat and may also provide the requisite tensile strength to the vulcanizer. The resistance wires H may project through a metal block L that is vulcanized or otherwise secured on to the strip K and their ends may be soldered thereto and covered by a strip L¹ detachably secured to the block L. By removing the strip L¹ access may be had to the ends of the conductors and thus any one may be released and withdrawn for the purpose of substituting another. The tubes J may constitute the heat conducting medium and may be applied direct to the surface to be treated or they may be covered with a thin metal plate.

It will be understood that all of the vulcanizers shown in the drawings may be made of any length or shape according to requirement and for this reason a portion of each construction only is shown.

In some cases it may be desirable to localize the pressure on the vulcanizer. For this purpose the device shown in Fig. 5 may be employed and it comprises a leather or other flexible strap M that has secured to it a series of nuts or screw-threaded washers N. Through each nut a thumb-screw N¹ is passed and this carries a block N². If it is desired to apply a flexible vulcanizer shown diagrammatically at O to a tire P while on the felly P¹, the vulcanizer may be secured by passing the strap M around the tire and the felly after the vulcanizer is in position and the blocks N² may be made to bear locally upon the vulcanizer. After the strap has been drawn tight, further pressure may be put upon the blocks by rotating the screws N¹. The position of the blocks can obviously be changed by sliding the strap around in one direction or the other by entering the screws in idle nuts shown at N³.

Instead of connecting all the conductors to a single terminal, their ends may be brought out separately and connected to separate terminals so that they may be variously grouped when using the apparatus to suit the voltage available.

If desired liquid, for instance water, may be employed as the heat-conducting medium and for this purpose the vulcanizer is made hollow, the interior being filled with the liquid and the conductors carried through it. For instance, the filling D may be omitted from the vulcanizer shown in Fig. 1 and the space between the cover C and the foundation A filled with water. It is found that with such an arrangement the heat is quickly conveyed from the resistance wires B to the heat distributing surface A. Instead of a liquid a finely divided solid may be used for the same purpose.

What I claim as my invention and desire to secure by Letters Patent is:—

1. A vulcanizing device comprising a flexible metallic strip adapted to be heated, and a flexible heat-conserving strip carried upon one face of the first-mentioned strip, the whole being in the form of a tape and adapted to make intimate contact with and to conform to the surface to be vulcanized.

2. A vulcanizing device comprising a flexible metallic strip adapted to be heated, and a flexible heat-conserving strip carried upon one face of the first-mentioned strip, said heat-conserving strip being somewhat narrower than the other strip whereby to leave the latter uncovered along its lateral edges, the whole being in the form of a tape and adapted to make intimate contact with and to conform to the surface to be vulcanized.

3. A vulcanizing device comprising a flexible heat-conducting metal base strip, an electrical conductor in close proximity to the strip and insulated therefrom, and a flexible cover of inferior heat-conducting material arranged over the said electrical conductor.

4. A vulcanizing apparatus comprising a flexible heat-conserving strip, a plurality of metal tubes secured thereto, electrical resistance wires passing through the tubes, and insulators carried by the wires within the tubes.

5. A vulcanizing device comprising a flexible heat-conserving strip, a plurality of metal tubes secured thereto, electrical resistance wires passing through the tubes, insulators carried by the wires within the tubes, a metal block secured to the heat-conserving strip and to which block one end of the wires is soldered and a covering strip detachably secured to the block over the soldered end of the wires.

6. In a vulcanizing apparatus, the combination with a flexible strap adapted to be passed around a wheel felly and a tire there-

on and to have its ends secured together,
threaded nuts on the strap, thumb-screws
passing through the nuts, a block carried by
each thumb-screw, and a flexible vulcanizing
5 device adapted to be applied to the tire and
to have the blocks pressed thereagainst.
In testimony whereof I have signed my

name to this specification in the presence of
two subscribing witnesses.

WILLIAM ROBERT SALMON FROST.

Witnesses:

PERCY W. H. HIGGINSON,
H. D. JAMESON.