L. JACOBSON.

APPARATUS FOR VULCANIZING VEHICLE TIRES.

APPLICATION FILED MAR. 15, 1918.

1,377,133. **Patented May 3, 1921.**

2 SHEETS—SHEET 1.

Fig. 1

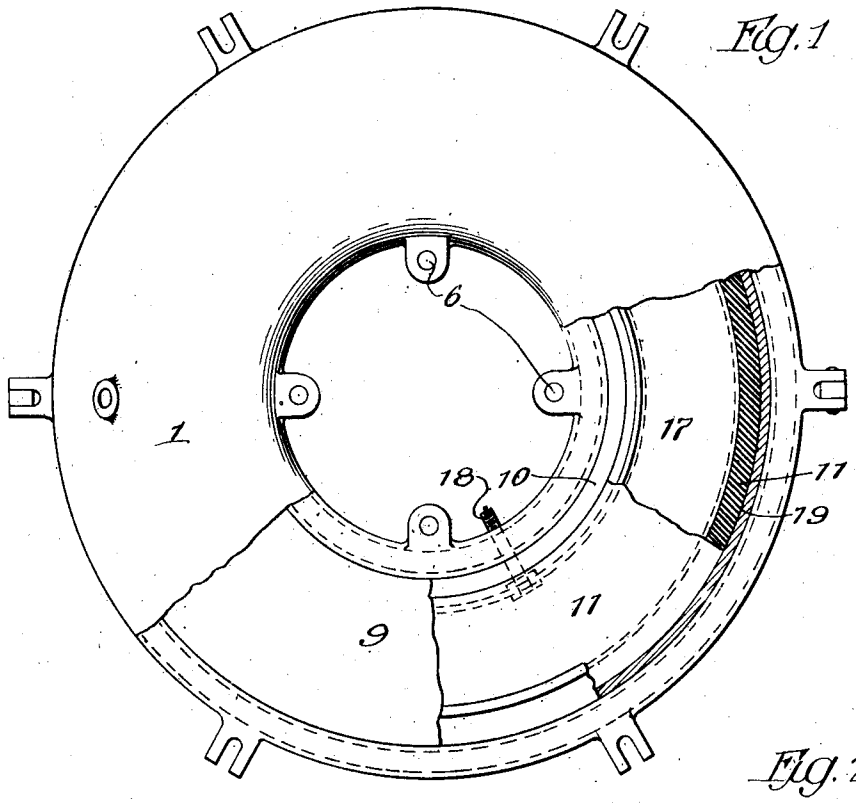


Fig. 2

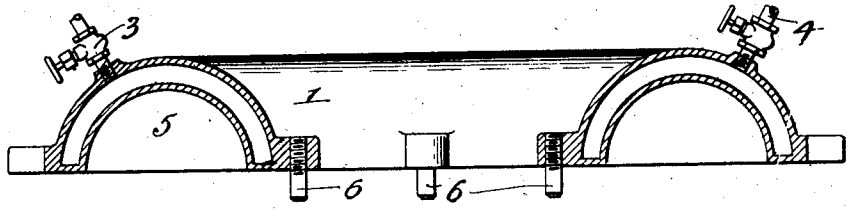
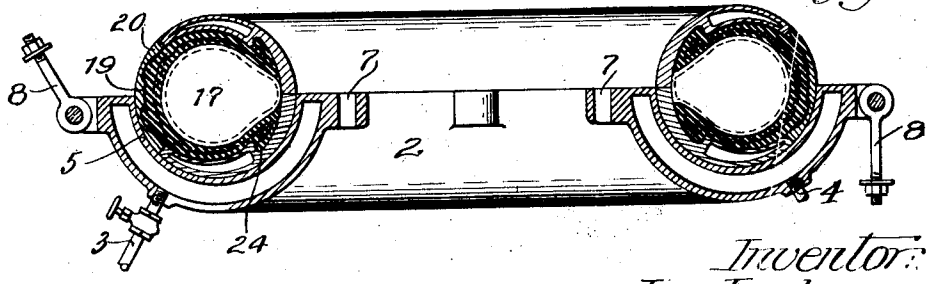


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

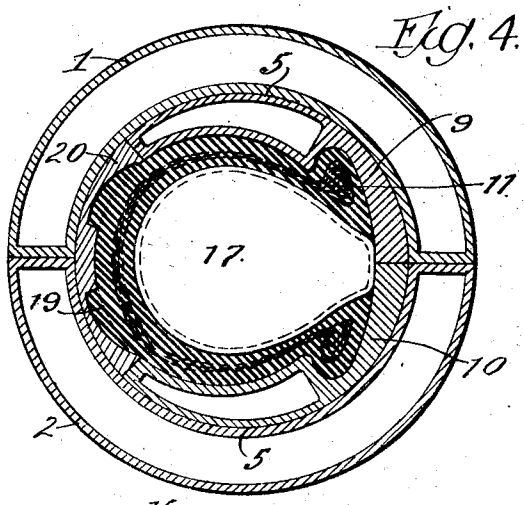


Fig. 6.

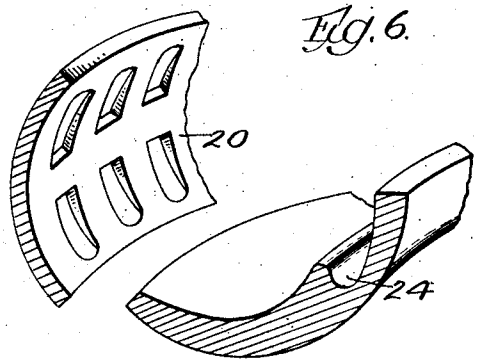


Fig. 5.

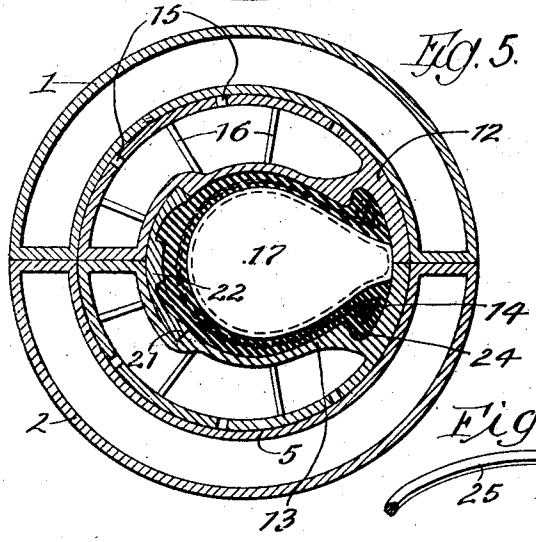


Fig. 7.

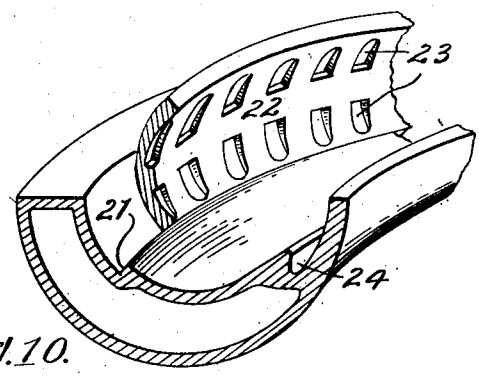


Fig. 10.

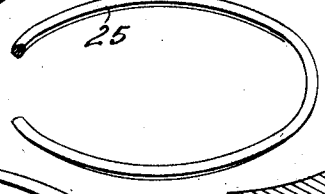


Fig. 8.

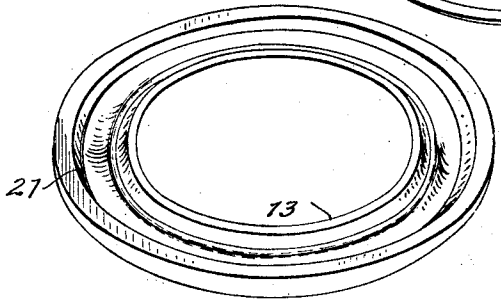
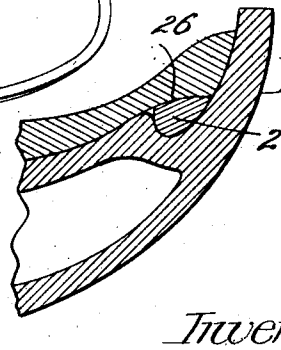


Fig. 9.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR VULCANIZING VEHICLE-TIRES.

1,377,133. Specification of Letters Patent. Patented May 3, 1921.

Application filed March 15, 1918. Serial No. 222,534.

To all whom it may concern:

Be it known that I, LEO JACOBSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Apparatus for Vulcanizing Vehicle-Tires, of which the following is a specification.

This invention relates to a vulcanizing apparatus designed more especially for rejuvenating or renewing old or worn out pneumatic vehicle tires, although the apparatus is equally serviceable for producing new tires.

Its chief object is to so organize the apparatus that a single heating chamber or jacket may be utilized in connection with a plurality of interchangeable molds or mold-shells of various sizes and designs, thus greatly simplifying the vulcanizing outfit and reducing its cost to a figure within the reach of tire-repairers in comparatively small communities where the cost of a variety of ordinary molds would be prohibitive.

Another object of the invention is to so construct the apparatus as to adapt it to the vulcanizing of both clencher tires and straight-beaded tires.

In the accompanying drawings:

Figure 1 is a top plan view, partly in section of the improved apparatus. Fig. 2 is a vertical central section of the upper half of the steam jacket. Fig. 3 is a similar section of the lower half thereof, and the upper and lower sections of one of the interchangeable tire-molds seated therein. Figs. 4 and 5 are enlarged cross sections of the apparatus showing molds of different sizes placed in the steam jacket. Fig. 6 is a fragmentary perspective view of one of the mold sections and one of the interchangeable tread-molding bands, the parts being separated. Fig. 7 is a similar view, showing a modified construction of the mold sections. Fig. 8 is a perspective view of one of the mold sections. Fig. 9 is a fragmentary cross section of one of the mold sections, on an enlarged scale, showing a filling ring seated in its clencher-bead groove to form a straight-beaded tire. Fig. 10 is a fragmentary perspective view of said ring.

Similar characters of reference indicate corresponding parts throughout the several views.

1 and 2 indicate respectively the upper and lower halves or opposing sections of a heating chamber or jacket which in its preferred form is annular and of circular cross section, as shown. Each of these sections is hollow for this purpose and adapted to receive superheated steam which is supplied to the section by a valved pipe 3 and discharged therefrom through a valved pipe 4. The two jacket sections are provided in their opposing sides with annular grooves or channels 5 of semi-circular cross section which together form an annular cavity of circular cross section adapted to receive the interchangeable tire molds about to be described. The contiguous faces of the jacket-sections are flat and the sections are centered on each other by dowels 6 on one section adapted to enter corresponding sockets 7 in the other. Swivel-bolts 8 or other suitable means are employed for firmly clamping the sections together.

Coöperating with one and the same steam jacket 1, 2 are a plurality of tire-molds or shells having cavities of different sizes or designs for molding and vulcanizing tires of various makes and sizes. Figs. 4 and 5 show by way of example, two of such molds, the former for vulcanizing a large tire and the latter for vulcanizing a relatively small one. In practice, however, about twenty of such interchangeable molds may be required for different makes and sizes of tires. 9, 10 designate the upper and lower sections of the large mold illustrated in Fig. 4, and 11 the tire, while 12, 13 designate the corresponding sections of the small mold shown in Fig. 5, and 14 the tire.

The cavities of the several interchangeable molds are of the proper shape and dimensions to produce tires of the desired sizes and cross sections, while the outer surfaces of the complete molds are circular or of any other desired shape to conform to the cavity of the encircling heating chamber or jacket. Each mold is constructed to fit closely within the jacket, so that the heat from the jacket is transmitted through the walls of the mold sections to the tire placed therein. For this purpose, the external diameter of all the molds is substantially equal to the internal diameter of the jacket, as shown. To lighten the molds, their walls are preferably hollow, at least in their thickest portions. To promote the transmission of the heat from the steam-jacket to the tire-cavity of the mold-sections, the latter may

be provided in their outer walls with perforations 15, and transverse heat conducting webs or ribs 16 may be extended from the outer to the inner walls of the molds, as shown in Fig. 5. The inner walls of the molds are however imperforate, as shown, to prevent direct contact of the steam with the tire.

17 indicates an air bag or core placed within the tire while being vulcanized and adapted to be inflated under the requisite pressure to expand the tire into the mold cavity. Air is supplied to this bag through a suitable valve 18.

Preferably combined with the sections of each mold is an annular metallic band arranged to form that part of the mold-cavity which molds the customary non-skid tread surfaces 19 of the tire. This band may be continuous or sectional. In the construction shown in Figs. 3, 4 and 6, this band is designated 20 and its longitudinal edges are of the same thicknesses as the adjacent edges of the tire mold-sections and abut squarely against the same, this being the preferred construction for the larger molds. In the embodiment shown in Figs. 5 and 7, the mold-sections meet on a line with the joint of the steam-jacket sections and are provided with an annular groove or recess 21 in which the tread-molding band 22 is removably seated. The bands 20, 22 have suitable cavities 23 to produce non-skid projections of the desired shape upon the tire-tread. A number of such bands are interchangeably used with each mold to suit the various makes and sizes of tires.

The molds are formed with the usual opposing annular grooves 24 to form the projecting beads of a clencher-tire, as shown in Figs. 3–7. To adapt the molds to the vulcanization of tires with straight or non-clencher beads, as well as clencher-tires, removable filling rings 25 of steel or other suitable material are preferably employed. Such a ring is placed in each of said grooves, as shown in Fig. 9 and its face is flat or slightly convex, as shown at 26 to give the tire-bead the desired shape.

Although my improved vulcanizing apparatus is suitable for molding and vulcanizing new tires, it is intended more particularly for repairing or renewing the worn out parts of old tires and giving the tread the wearing qualities and appearance of a new tire. In repairing such old tires of the pneumatic type, it is very desirable to rebuild them by removing the old rubber of the carcass from the tread to the beads and replacing it with new rubber, and to repair any bruises and blow out by putting a heavy liner on the inside of the tire which also reinforces the stretched and worn out parts. After making such repairs, the inflatable bag is inserted in the tire which is then put into the lower section of the corresponding mold which has been previously placed in the lower part of the steam jacket. The upper halves of the mold and the jacket are next put in place and the parts of the jacket locked together by the bolts 8 and finally superheated steam or any other suitable heating agent is admitted to the jacket and the tire is subjected to the vulcanizing process until properly cured.

The resulting tire is practically rejuvenated, presenting the appearance of an entirely new tire and possessing renewed wearing qualities which materially prolong its life.

All portions of the tire are treated at one operation, producing uniform vulcanization and expediting and reducing the cost of the work.

As the apparatus comprises a plurality of different-sized molds which are interchangeably used with one and the same heating element or steam-jacket, the outfit effects an important economy, not only by dispensing with a separate steam-jacket for each mold but also by saving labor and requiring less piping and other material, especially in repair plants of limited size such as exist in small communities. In such cases it has the advantage of requiring a comparatively small shop with a correspondingly low overhead expense, and a small steam boiler to supply the steam-jacket. It also has the advantage that a repairer in a small town may originally purchase only the steam-jacket and a few molds of different sizes or makes and add to his outfit as his means permit.

While my invention is herein shown and described in connection with a pneumatic tire, it is also useful for vulcanizing new solid tires as well as repairing old ones of this type.

I claim as my invention:

1. A tire vulcanizing device comprising a heating unit consisting of upper and lower continuous rings substantially semi-circular in cross section and in contact with each other at their inner and outer edges, said rings being of hollow form to receive a heating agent, the abutting sides of said rings being channeled between their inner and outer edges to mutually co-act in forming a mold cavity, and a plurality of continuous tire molds each formed of upper and lower rings contacting with each other at their inner peripheries, the external sides of said rings being of uniform size to allow any of the several molds to be snugly received in said tire cavity, while the internal sizes of said rings vary for engagement with tires of different sizes, each of said mold rings being provided with spaced inner and outer walls.

2. A tire vulcanizing device comprising a heating unit consisting of upper and lower rings substantially semi-circular in cross section and of hollow form to receive a heating agent, the adjacent sides of said rings having channels mutually co-acting to form a continuous mold receiving cavity and contacting with each other at both the inner and outer edges of the channels and an annular tire mold totally received in said cavity and formed of two separable side rings and a tread forming ring removably associated with said side rings.

3. A tire vulcanizing device comprising a heating unit consisting of upper and lower rings of hollow form to receive a heating agent, the adjacent sides of said rings having channels mutually co-acting to form a continuous mold receiving cavity, an annular tire mold snugly received in said cavity and including upper and lower side rings formed with an internal circumferential groove at the periphery of the mold, and a tread forming ring snugly but removably seated in said groove.

4. A structure as specified in claim 2, each of said side rings having spaced inner and outer walls and heat radiating ribs extending between them and joined integrally therewith.

LEO JACOBSON.