Oct. 27, 1925. 1,558,792

R. H. CHURCHILL

VULCANIZING MATERIAL AND APPARATUS

Filed March 19, 1923

Fig 1.

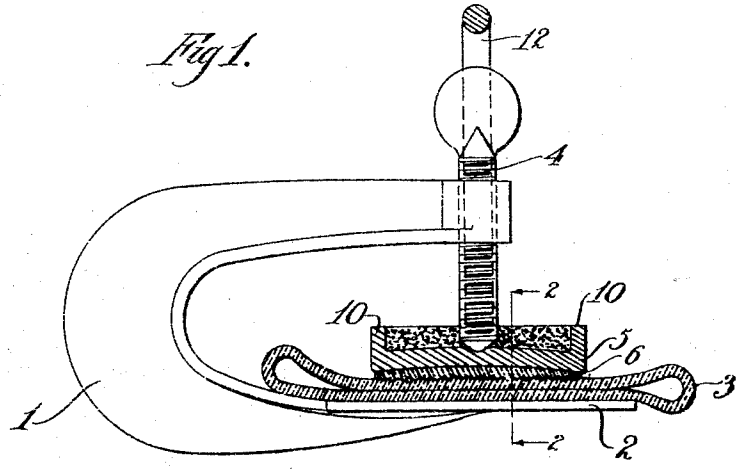


Fig 2.

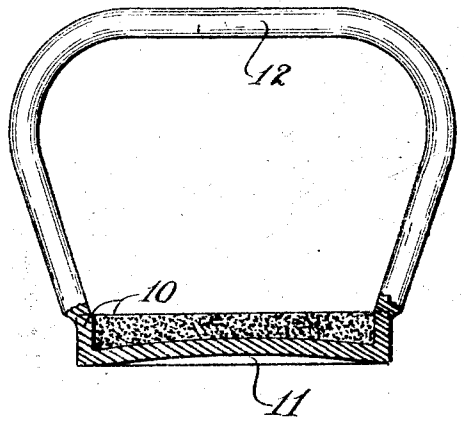


Fig 3.

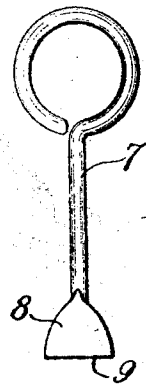


Fig 4.



Witness.
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By Burton & Burton
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UNITED STATES PATENT OFFICE.

RALPH H. CHURCHILL, OF CHICAGO, ILLINOIS.

VULCANIZING MATERIAL AND APPARATUS.

Application filed March 19, 1923. Serial No. 626,008.

To all whom it may concern:

Be it known that I, RALPH H. CHURCHILL, a citizen of the United States, residing in the city of Chicago, county of Cook, and the State of Illinois, have invented certain new and useful Improvements in Vulcanizing Material and Apparatus, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

This invention relates to portable vulcanizing apparatus, particularly designed for mending automobile tires and the like, and its purpose is to provide a heat-producing fuel in combination with means arranged to transmit the heat at a moderate rate and throughout a sufficiently long interval to avoid over-heating or burning the material to be vulcanized while insuring a sufficient temperature for the best results.

In the drawings:—

Figure 1 is a side elevation, partly in section, showing the apparatus and fuel embodying this invention applied to the operation of vulcanizing a patch on a tire tube.

Figure 2 is a transverse section of the fuel-holding cup taken as indicated at line, 2—2, on Figure 1.

Figure 3 is an elevation of a tamping tool.

Figure 4 is a detail of the tamping tool blade.

It is my experience that with many portable vulcanizing outfits now in use in which the fuel is supplied in a dry compressed block and is burned in a thin metal pan which comes in direct contact with the patch, the temperature produced is necessarily kept too low because the heat is transmitted so quickly from the fuel through the thin pan, with the result that the patching rubber is not properly cooked and is not firmly united to the rubber of the punctured tube. In common with such devices I provide a clamp, 1, having a plate or table, 2, upon which the portion of the tube, 3, to be mended lies, and provided with a clamp screw, 4, arranged to be adjusted toward and from the plate, 2. But, instead of employing a thin metal pan, I provide a metallic cup, 5, which is relatively thick and thus provides a considerable mass of metal for initially absorbing heat from the fuel and gradually transmitting it to the patching rubber which is to be vulcanized.

Instead of the usual grade of patching rubber provided in portable outfits, I prefer to use a patch, 6, of fairly raw rubber which is substantially the same grade as would be used in a stationary steam-heated vulcanizing outfit. In the process of applying the patch, after carefully cleaning the surface of the tube, 3, with sandpaper or other abrasive means and thus slightly roughening this surface, I not only press the patch, 6, onto the roughened surface of the tube, 3, but insure good contact and the elimination of air bubbles by the use of a tamping tool, 7, such as that shown in Figures 3 and 4, having a flattened blade, 8, whose edge, 9, is not sharp enough to cut through the patch, but is narrow enough to serve for pressing small areas of the patch in close contact with the tube surface. The result is illustrated in exaggerated fashion in the sectional portion of Figure 1, at which the under surface of the patch and the under surface of the tube are shown as irregularly corrugated.

The fuel cup, 5, being relatively thick and heavy, is stiff enough so that its bottom will transmit pressure from the clamp screw, 4, over the entire area of the patch without the necessity of any supplemental pressure member being interposed between the screw and the cup. The screw impinges, as shown, directly against the bottom of the cup, 5.

By experiment, I have found that a very satisfactory fuel for this purpose consists of a fine granular mixture of sulphur, pulverized aluminum and very finely powdered metallic lead which is known commercially as "atomized lead." This mixture is not readily inflammable and may be safely carried in a can or bottle. I designed the cup, 5, with its edges or flanges, 10, of such height that when the cup is just level full of my pulverized fuel mixture, the quantity of fuel is sufficient to provide the proper amount of heat for completely vulcanizing a patch of an area approximately equal to that of the area of the bottom of the cup, 5. This charge of fuel is easily ignited by placing the head of a burning match directly into the fuel, whereupon the sulphur will catch fire and will at once ignite the powdered aluminum, the latter burning with an intense heat and the combustion spreading rapidly throughout the charge. The heat generated by the burning of the aluminum

is properly absorbed at once by the thick metal cup, 5, and is partly utilized to melt the powdered lead which may be observed accumulating in globules upon the bottom of the cup, 5. After the fuel has burned itself out, this melted lead gradually cools, giving up most of its heat to the cup, 5, which in turn gradually transmits the heat to the patch rubber, 6, for vulcanizing it securely to the tube, 3. This transmission of heat is designed to occupy a period of about twelve minutes which is the approved time observed in vulcanizing with steam-heated apparatus, so that the result is in every way equivalent to that obtained with the present stationary devices employing steam. My outfit, however, has the advantage of cheapness and portability, making it suitable for roadside repairs which can be made by a novice as successfully as by an expert.

As usual in such devices, the under surface of the cup, 5, is made concave, as indicated at 11, so as to form the patch with a thin edge and insure plenty of pressure at the edge during the vulcanizing process. Preferably as shown, the cup, 5, may be provided with a bail or handle, 12, by which it may be lifted even while the cup portion is still quite hot.

I have found by experiment that the most satisfactory fuel mixture consists of the following proportions of the elements by weight: 2 parts of sulphur; 1 part of aluminum; 1 part of lead.

I claim:—

1. In vulcanizing apparatus, a fuel adapted to generate intense heat mixed with finely divided metallic material adapted to be melted by such heat and to radiate the heat gradually as it solidifies.

2. In vulcanizing apparatus, a fuel comprising a granular mixture of pulverized aluminum, finely divided lead and sulphur.

3. In vulcanizing apparatus, a fuel comprising a granular mixture of pulverized aluminum and finely divided metallic material intermingled therewith in sufficient quantity to retard combustion of the aluminum.

4. A vulcanizing fuel which includes a readily ignitable element, an inflammable element which tends to burn rapidly at a high temperature and a finely divided element distributed throughout the inflammable material and intermingled therewith adapted to be liquefied by the temperature of combustion and thus serving to store heat and to radiate said heat gradually as it solidifies.

5. In vulcanizing apparatus, the combination of a fuel which is normally quick burning at a high temperature combined with a blanketing material intermingled with the fuel and adapted to retard combustion, said material also serving to absorb the heat of combustion and to radiate it gradually to the material to be vulcanized; and a thick walled container for the fuel which shields the rubber from the high temperature of combustion by absorbing heat and radiating it gradually.

6. In vulcanizing apparatus a relatively thick metallic cup and a fuel to be burned therein including finely divided metallic lead which is liquefied during combustion of the fuel and thus serves to store heat and to radiate such heat gradually to and through the cup as the lead cools and solidifies.

7. A fuel for use in vulcanizing apparatus comprising a granular mixture of pulverized aluminum, finely powdered lead and sulphur in the proportion by weight of one part aluminum, one part lead and two parts sulphur.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 16th day of March, A. D., 1923.

RALPH H. CHURCHILL.