

June 27, 1939.

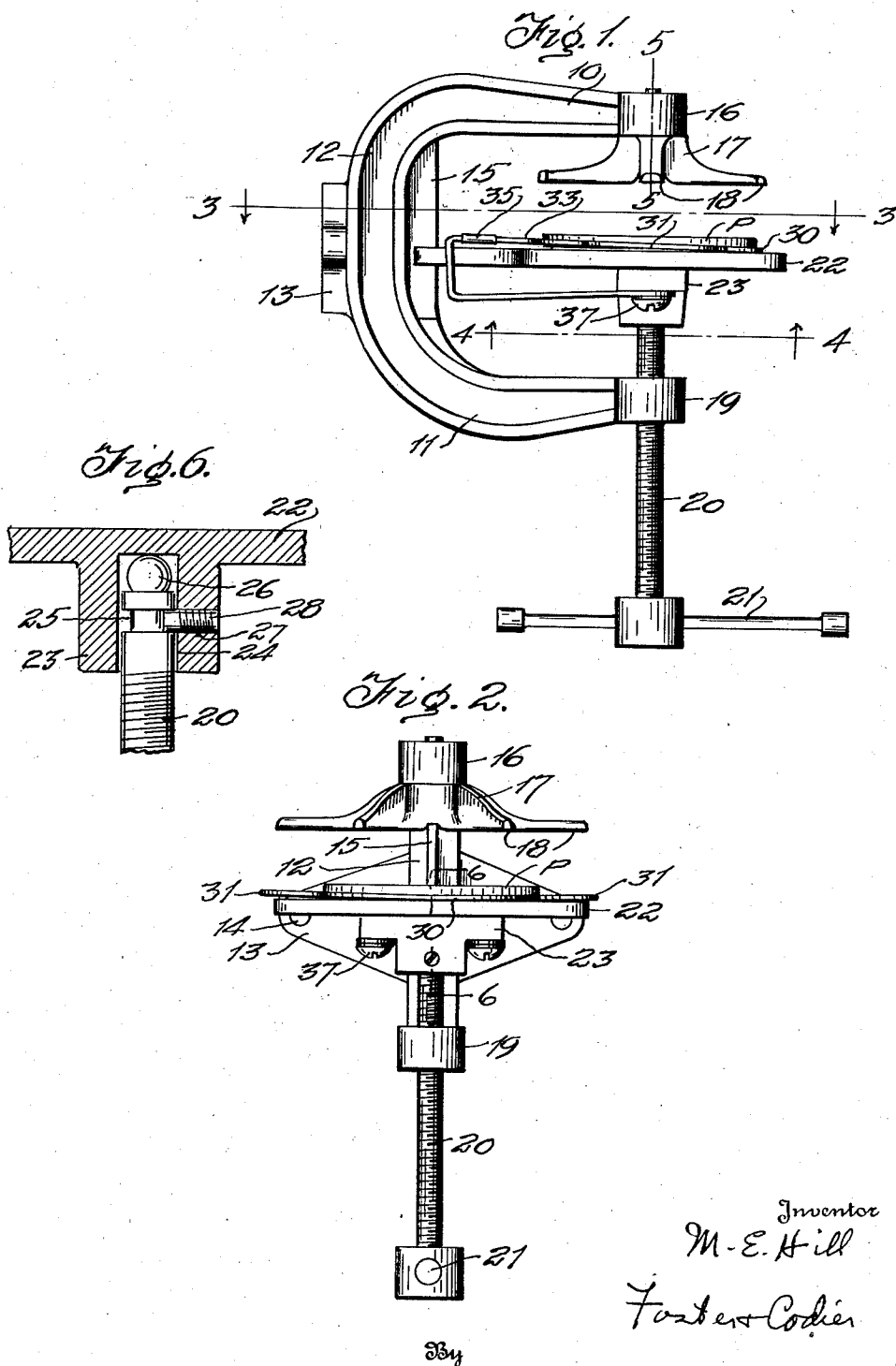
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CLAMP FOR VULCANIZING PATCHES

Filed Jan. 10, 1936

3 Sheets-Sheet 1



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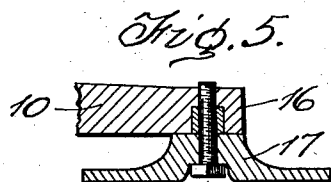
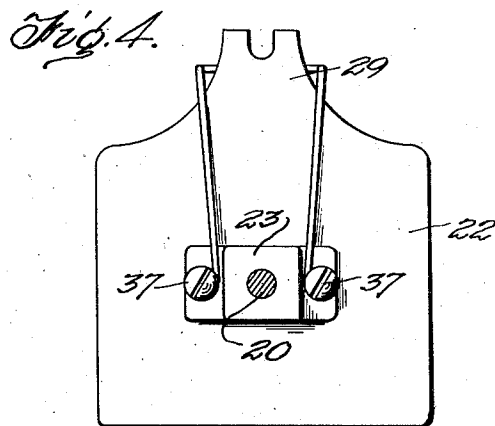
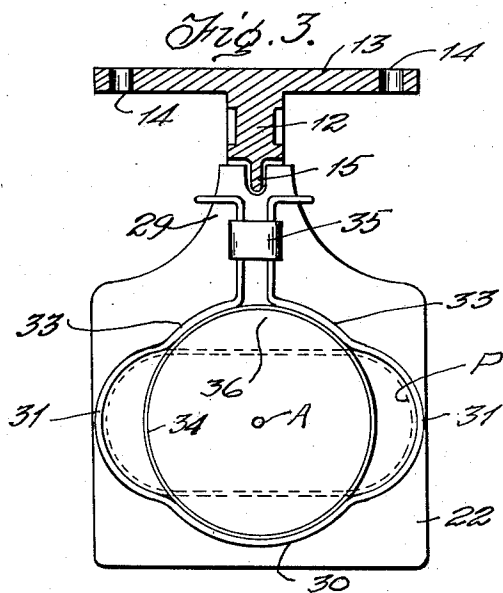
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3 Sheets-Sheet 2



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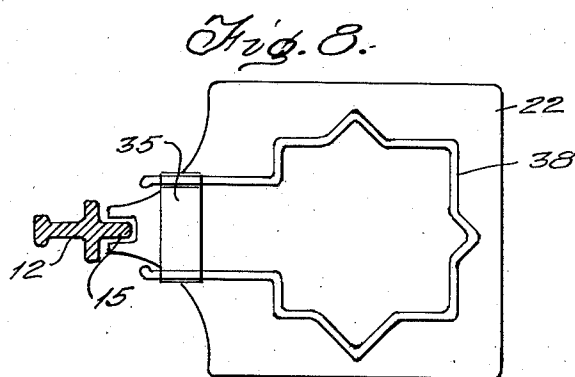
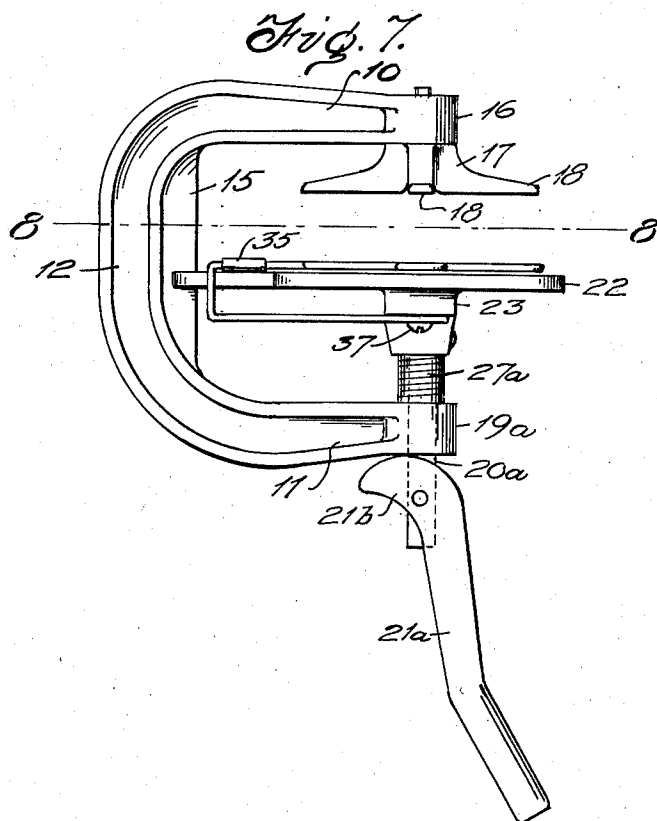
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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CLAMP FOR VULCANIZING PATCHES

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8 Claims. (Cl. 18-18)

This invention relates to clamps for vulcanizers and has special reference to a clamp for positioning vulcanizing patches of the character embodying a patch and heating fuel therefor, on a suitable article such as an inner tube for a tire, over a puncture, rip or the like.

Such clamps have been used before this invention but have not been provided with means for easily and accurately centering the injury in the article to be repaired directly in the line of pressure exerted by the clamp, and centering the patch over the injury.

In the repairing of punctures, slits, tears and other injuries to the inner tubes of tires it is highly important that the injury to the tube be properly centered beneath the position to be occupied by the patch and that the patch be properly centered over such injury. Such patches as are used for this purpose usually consist of a piece of raw rubber adhesively held on the bottom of a shallow metal pan, the latter being filled with a suitable combustible which when ignited, provides the necessary heat for vulcanizing the raw rubber patch over the injury to the tube. Clamps are used for pressing such pans and patches firmly into contact with the tube to be repaired, but as ordinarily constructed no means are provided by which the injury can be centered visually, in a practically accurate manner in the clamp and then the pan be mechanically centered over the injury. The reason for its importance will be appreciated when it is considered that the shallow pans used are of thin metal, so that upon application of pressure to their rim portions the central part of the patch on the bottom receives less pressure than the peripheral portions of the patch, whereby the patch is compressed when heated to lenticular form with a relatively thick center and a relatively knife-edged periphery. Consequently, if by miscentering, the injury is positioned beneath the thin peripheral portion of the patch, weakness exists and inflation of the tube results in a blow-out. In the present invention means are provided whereby the injury to the tube may be visually centered in the clamp used in such manner that the center of pressure effected by the clamp will be central with the injury and then the pan with its patch may be applied in such manner that the patch will be centered over the injury. By this means, when the operation is completed, the injury will be covered by the thickest portion of the patch.

One important object of the present invention is to provide an improved form of such clamp whereby a suitably shaped vulcanizing element may be

held in proper position for vulcanizing a patch centrally over the puncture or tear in a tube or other article.

Such clamps have also been devised wherein there is either no means or some special means, separate from the means for positioning the vulcanizing pans, for holding the tube or other article in position.

A second important object of the present invention is to provide a novel and efficient means for holding the tube or other article in position during the vulcanizing operation.

A third important object of the invention is to provide novel resilient means to hold the tube or other article in position which will operate effectively in a manner independent of the size of the tube or other article, and without respect to irregularities in the thickness of the material therein.

A fourth important object of the invention is to provide novel holding means for the tube or other article to be vulcanized which will effectively hold the same in position in all positions of the movable member of the clamp.

Apparatus has been devised for the purpose set forth, wherein there is provided a fixed platen designed to support an injured portion of a tube and a spider movable toward and from this platen to engage the rim of a pan such as has been previously mentioned, and to press the patch held on the bottom of such pan against the injured portion of a tube. In such apparatus the spider has been carried by a joint having a ball and socket action on the end of a screw. With such apparatus it is necessary to hold the spider against rotation and in proper position to engage the rim of the pan. The natural and usual method of doing this is with the fingers of the operator. Since in this type of apparatus the heat from the fuel in the pan rises and directly heats the spider, it quickly becomes difficult and inconvenient to adjust the spider to proper position relative to the pan, and danger of burning the fingers of the operator arises, so that such apparatus is functionally deficient.

A fifth important object of the invention is, therefore, to provide an improved form of vulcanizing clamp adapted to have a spider member engaging the periphery of a pan unit, and wherein the spider member will be constantly held against rotation, so that at no time will it have to be manipulated to seat properly on the pan rim.

At the same time it is essential that a clamp for this purpose be provided with opposed clamping members, one or both of which will be tiltable so

that independently of the irregularities in the thickness of the parts of the tube being repaired, the pressure exerted by such clamping members will be uniformly distributed substantially around the periphery of the patch. It is obvious that such a clamp, having a spider to engage the edge portions of a pan constituting part of the vulcanizing unit and having a platen to support the tube to be repaired, will be imperfect in operation if the spider or upper member be arranged as a relatively movable member to move toward and from a platen or lower member, constituting a relatively fixed member, for several reasons. In the first place, as above mentioned, such a spider will become too hot to be handled after one or two closely spaced operations as are common in the operation of devices of this character. In the second place the relatively movable member, and especially the means for moving it, must be kept well lubricated. For instance, if the spider which is necessarily located above the platen, is carried by a ball and socket joint on the lower end of an adjusting screw extending through the upper part of the clamp frame, then the lubrication provided for the screw and the ball and socket joint may either burn out or run and drop onto the tube under repair as soon as the vulcanizing heat is developed.

A sixth object of the present invention is to provide a device of this class wherein all parts above the vulcanizing pan are movable so that they require neither manual adjustment nor lubrication, and thus, even though exposed directly to the vulcanizing heat developed by the fuel burnt in the pan, will not act to interfere with the operation of the invention.

A seventh important object of the invention is to provide a movable clamp member so arranged that it cannot revolve during its movement toward and from a relatively stationary clamp member, said movable member having means carried therewith to hold an article in fixed position relative to said movable member.

With the above and other objects in view, the invention consists in general of certain novel details of construction and combinations of parts hereinafter fully described, illustrated in the accompanying drawings and specifically claimed.

In the accompanying drawings like characters of reference indicate like parts in the several views, and

Figure 1 is a side elevation of one form of the invention.

Figure 2 is a front elevation thereof.

Figure 3 is a section on the line 3—3 of Figure 1.

Figure 4 is a detail section on the line 4—4 of Figure 1.

Figure 5 is a detail section on the line 5—5 of Figure 2.

Figure 6 is a detail section on the line 6—6 of Figure 1.

Figure 7 is a side elevation of a modified form of the invention.

Figure 8 is a section on the line 8—8 of Figure 7.

In both forms of the embodiments of the invention as herein disclosed there is provided a substantially C-shaped frame having an upper arm 10 and a lower arm 11, the major part of the frame being I-shaped in cross section. At the back or vertical portion 12 of this frame, in the form shown in Figures 1 and 2, there is provided a pair of laterally extending wings 13 provided with bolt or screw openings 14 so that the

frame may be secured by suitable bolts or screws to any desired support. Extending forwardly from the vertical portion of the frame is a rib 15, the purpose of which will presently be described. It is, however, to be understood that this rib simply constitutes a vertical guide and may have any other equivalent guide means substituted therefor.

At the forward end of the upper arm 10 is a boss 16 to which is fixed a spider 17 having outwardly extending and downwardly curved arms having flat under surfaces or feet 18. The lower arm 11 is similarly provided at its extremity with a boss 19. In the form shown in Figures 1 and 2 this boss has an internally threaded opening wherethrough extends a screw 20 provided at its lower end with manually operable means 21 by which the screw may be rotated, and thus caused to travel toward and from the spider, the screw being axially aligned with the center of said spider.

In the form of the invention shown in Figure 7 the boss 19 is replaced by a cylindrically apertured boss 19a wherethrough passes a slidable plunger 20a and below the boss 19a the stem or plunger 20a has pivoted thereto a cam lever 21a which has a cam end 21b engaging the under side of the boss 19a, so that upon the handle end of the boss 21a being pulled downwardly, the stem or plunger 20a moves downwardly through the boss 19a.

Between the arms 10 and 11 is located a platen or platform 22 which is provided on its under side with a boss 23 provided with a recess 24 which extends upwardly from its lower face. In this recess loosely fits the upper end of the screw 20 or the plunger 20a as the case may be, each of which is provided at this upper end with a peripheral groove 25 wherein seats the end of a screw 26 inserted through a suitable threaded opening 27.

This screw engages in the groove 25 and thus holds the platen to move with the screw 20 or plunger 20a as the case may be. On the upper end of the screw 20 or plunger 20a is positioned a hardened steel bearing ball 26 which forms a support for the platen. Obviously, this ball 26 may be omitted if desired, and this is especially true of the form of the invention shown in Figure 7.

In the form shown in Figure 7 a spring 27a between the boss 19a and the boss 23 urges the platen up towards the spider.

At the rear edge of the platen 22 in each form is a forked extension 29 the arms of which straddle the rib 15 or other guide means, so that the platen is held from rotation as it is moved up and down by the screw.

On top of the platen 22 is located a loop of spring wire, which is shown in Figure 3 as having a front arcuate lobe 30 and lateral oppositely disposed lobes 31 which latter are of such size and shape as to embrace the ends of an elongated pan indicated at P in dotted lines, this being the usual elongated patch unit. From the lobes 31 the wire extends rearwardly in arcuate portions 33 to enclose and center a round pan, indicated at 34, such pan being held between the portions 33 and lobe 30 and being the ordinary circular vulcanizing or patch unit. The wire extends backwardly from the portions 33 and engages in a sleeve 35 surrounding the parallel portion 36 of the wire above the platen 22. From the rear of the flanges 35 the wire ends extend down around the rear side edges of the platen 22 and forwardly to the sides of the boss where they are secured by screws 37. By means of this arrange-

ment the loop formed by the lobes 30 and 31 is urged constantly against the upper surface of the platen 22.

This loop may have an alternative form to accommodate rectangular pans, the form being such as is shown in Figure 8 at 38. Obviously, the loop may be of any other desired form but it is not deemed necessary nor desirable to here show all forms in which this loop may be made. In all cases, however, it will be obvious that the injury to any tube, when the latter is placed on the platen beneath the loop, may be positioned by eye with very close approximation to the center of the loop, and since the loop is in all cases formed to center the pan, after the injury has been centered, the pan will by its positioning in the loop, automatically center the patch over the injury.

In use the tube to be vulcanized is placed on the platen beneath the spring clamp in such position that the puncture or tear is centered as at A in Figure 3 by eye in the center of the loop, the spring clamp or loop serving to retain the article in this position during the remainder of the operation. Next, depending on the size and shape of the puncture or tear, a suitable vulcanizing unit consisting of a pan having fuel therein and a patch on its underside is positioned in the wire loop forming the clamping spring. Obviously, the vulcanizing units will be held in position by the wire loop, but if it is desired to use a smaller unit than the loop 33, the latter may be manually held but will be centered by eye in the loop. The screw or plunger is then manipulated until the platen is raised to such position that the spider engages the pan and presses the patch firmly on the article being repaired. Next the fuel in the pan is ignited and the patch is vulcanized in position in the usual manner. Finally the screw or plunger is loosened and the patched article withdrawn.

There has thus been provided a simple and efficient device of the kind described and for the purpose specified.

It is obvious that changes may be made in the form and proportions of the device without departing from the spirit of the invention. It is not, therefore, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such as come within the scope of the appended claims.

What is claimed is:

1. A vulcanizing clamp including a frame having an upper and a lower arm, a clamping screw threaded through said lower arm and projecting upwardly therefrom, a platen loosely mounted on the upper end of said screw so that the screw can turn while the platen does not, a spider carried by said upper arm and having arms extending over said platen, and a spring member attached to said platen and extending thereover to grip an article onto the platen during vulcanization said spring having a loop of proper size and shape to receive and closely fit around peripheral portions of the standard shapes of the pans of vulcanizing units.

2. A vulcanizing clamp including a frame having an upper and a lower arm, pressure means extending through said lower arm and projecting upwardly therefrom, a platen mounted on the upper end of said pressure means, means for holding said platen against rotation relatively to the said frame, a spider carried by said upper arm and having arms extending over said platen, and a spring clamp attached to said platen and

extending thereover to grip an article to be vulcanized onto the platen, said spring clamp having a space within its periphery so constructed and arranged as to receive and position a freely movable vulcanizing unit, and having a shape conforming with the shape of the common vulcanizing units.

3. A vulcanizing clamp including a frame having an upper and a lower arm, pressure means extending through said lower arm and projecting upwardly therefrom, a platen mounted on the upper end of said pressure means, a spider carried by said upper arm and having arms extending over said platen, and a spring clamp attached to said platen and extending thereover to grip an article to be vulcanized onto the platen, said spring clamp being formed of wire and having an open loop extending over the upper surface of said platen said spring having a loop of proper size and shape to receive and closely fit around peripheral portions of the standard shapes of the pans of vulcanizing units.

4. A vulcanizing clamp including a frame having an upper arm and a lower arm, a clamping screw threaded through said lower arm and projecting upwardly therefrom, a platen mounted on the upper end of said screw, rotation of said screw causing a raising and lowering of said platen, a spider carried by said upper arm and having arms extending over said platen, and a spring clamp attached to said platen and extending thereover to grip a freely movable vulcanizing unit having a patch on its bottom to be vulcanized onto the platen, said spring clamp being formed of wire and having an open loop extending over the upper surface of said platen, and provided with oppositely disposed lobes adapted to receive peripheral portions of the vulcanizing unit to position the latter.

5. A vulcanizing clamp including a frame having an upper and a lower arm, a clamping screw threaded through said lower arm and projecting upwardly therefrom, a platen loosely mounted on the upper end of said screw, a spider carried by said upper arm and having arms extending over said platen, a spring clamp attached to said platen and extending thereover to grip an article to be vulcanized onto the platen, and means to prevent rotation of said platen during its actuation by the screw, said spring clamp being of a size and shape to position either the common round or oval vulcanizing units.

6. A vulcanizing clamp including a frame having an upper and a lower arm, a clamping screw threaded through said lower arm and projecting upwardly therefrom, a platen loosely mounted on the upper end of said screw, a spider carried by said upper arm and having arms extending over said platen, a spring clamp attached to said platen and extending thereover to grip an article to be vulcanized onto the platen, said spring clamp having a space within its periphery so constructed and arranged as to receive and position a vulcanizing unit, a guide on said frame extending vertically thereof, and means on the platen slidably engaging the guide to hold the platen against rotation as it is moved upwardly and downwardly by said screw.

7. A vulcanizer including a frame having opposing members, one of said members carrying immovable arms for engaging a pan adapted to contain a combustible medium, the other member carrying a vertically movable platen which is loosely mounted thereon, said platen having attached thereto a clamp which extends there-

over to grip an article which is to be vulcanized, said clamp having a space within its periphery so constructed and arranged as to receive and position a vulcanizing unit, and means for adjustably moving the said platen upwardly and downwardly.

8. A vulcanizing clamp including a frame having opposing members, one of said members carrying immovable arms for engaging a cup adapted to contain a combustible medium, the other member carrying a vertically movable platen which

is loosely mounted thereon, and which platen is provided with means for adjustably raising and lowering the same, said platen having attached thereto a clamp which extends thereover to grip an article which is to be vulcanized, said clamp having a space within its periphery, said space within the periphery of the clamp being shaped to receive and position vulcanizing units of a plurality of sizes and shapes.

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