March 12, 1940. L. KENDALL 2,193,514

INNER TUBE REPAIRING DEVICE

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Fig. 1.

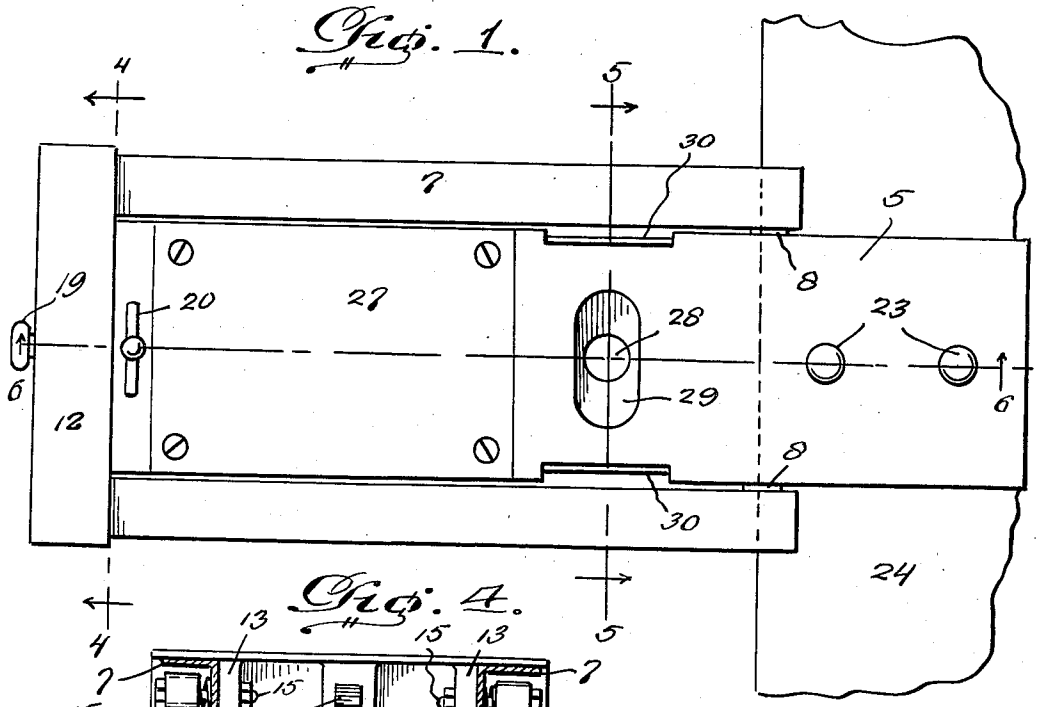


Fig. 4.

Fig. 3.

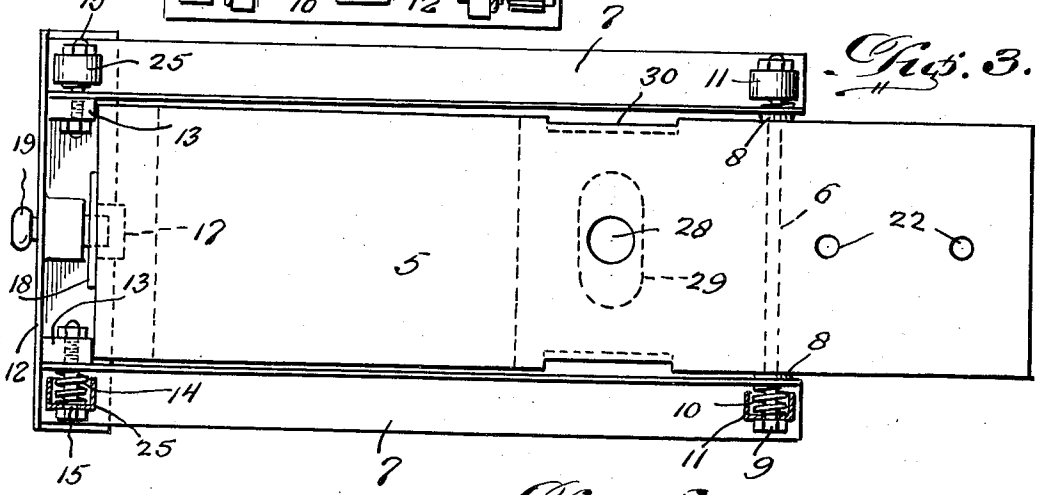
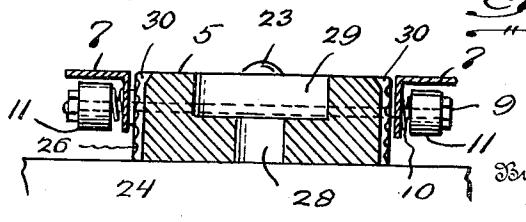


Fig. 5.



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Fig. 2.

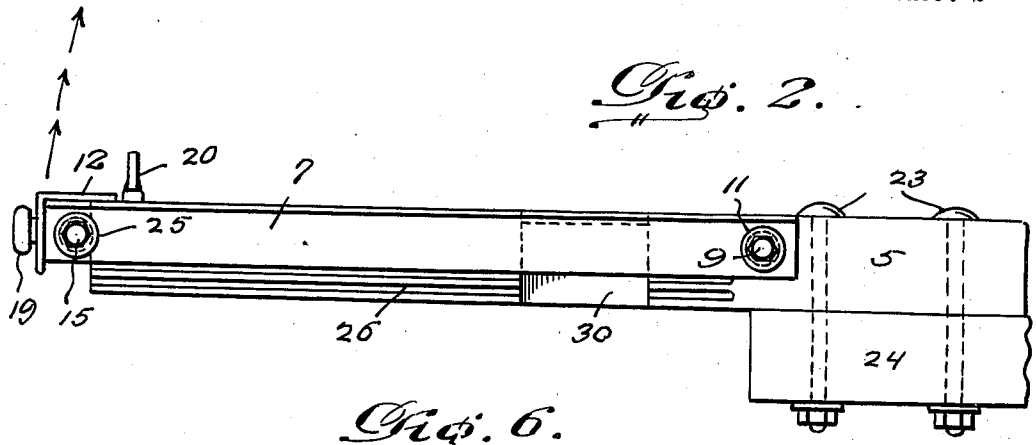


Fig. 6.

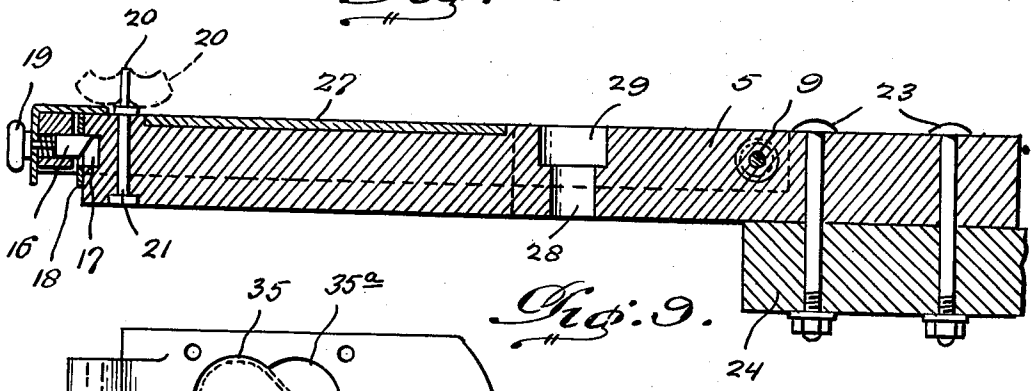


Fig. 9.

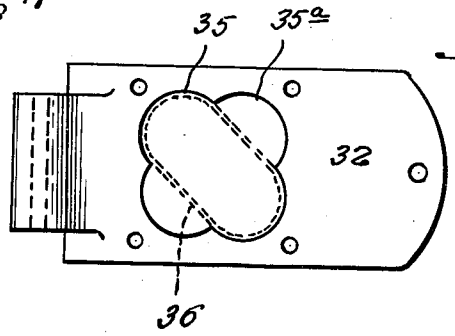
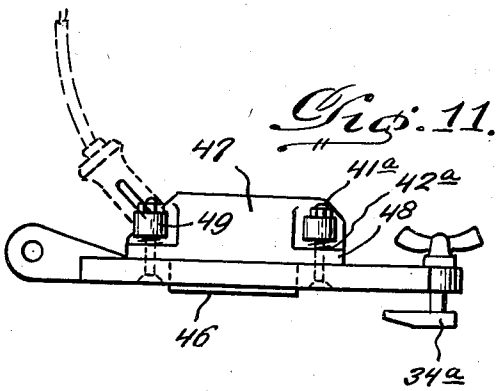


Fig. 11.



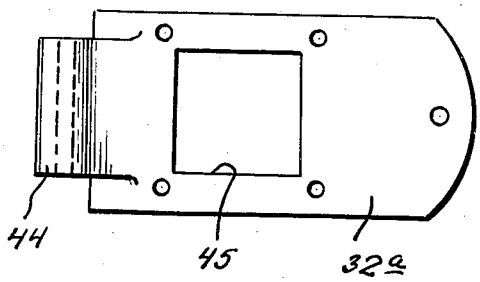


Fig. 10.

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Fig. 7.

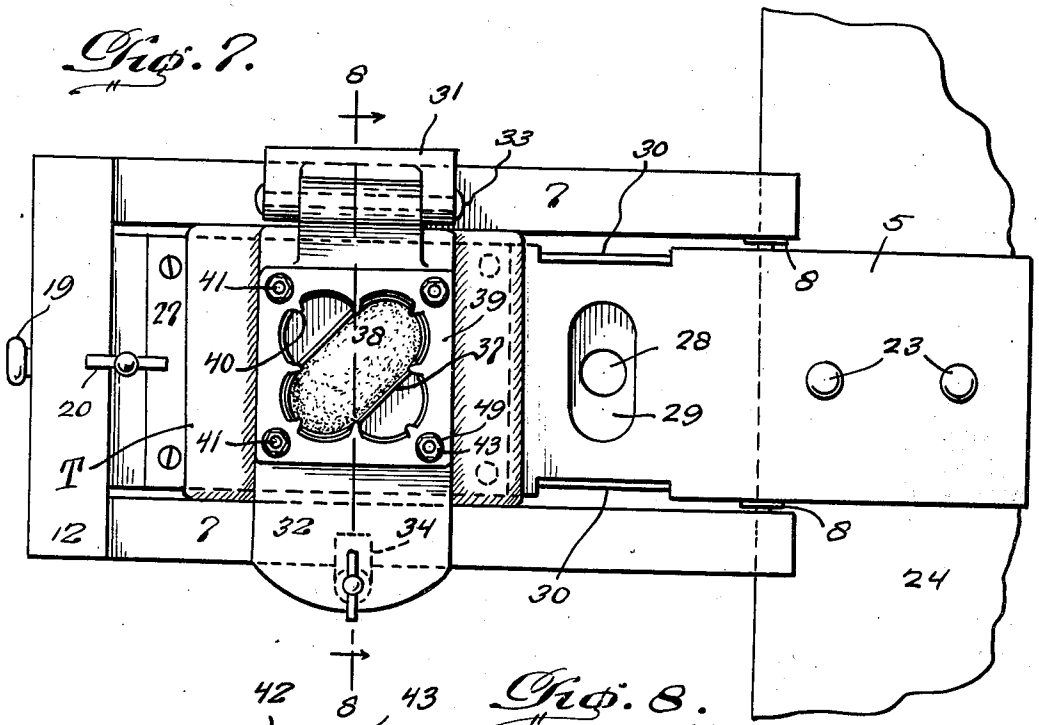
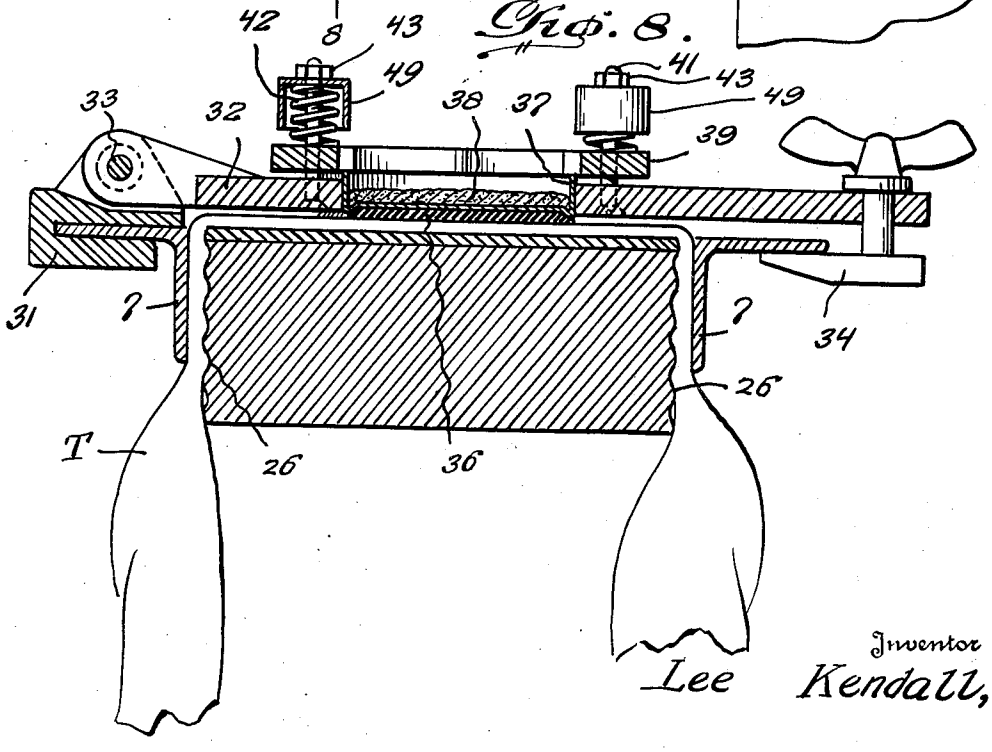


Fig. 8.



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Patented Mar. 12, 1940 2,193,514

UNITED STATES PATENT OFFICE

2,193,514

INNER TUBE REPAIRING DEVICE

Lee Kendall, Evanston, Ill.

Application November 18, 1937, Serial No. 175,344

9 Claims. (Cl. 18—18)

My invention relates to a novel and efficient device for holding an inner tube of an automobile tire, or other similar article, in such manner as to conveniently permit the operations thereon incident to the application of a repair patch to such tube or similar article.

The primary object of my invention is to provide means whereby the repair of inner tubes or similar articles by the application of a patch thereto may be most expeditiously carried out.

A further object of the present invention is to provide a repairing device of the above kind including a base block, and novel means of a simple and efficient nature for securing a section of inner tube on one face of the base block and in a smooth and flattened condition for the ready performance of operations thereon necessary to effect the application of a repair patch.

A still further object of the present invention is to provide improved means for the application of pressure and heat to the patch when a patch of the "fuelled" or vulcanized type is used.

With the above general objects in view, and others which will become apparent as the nature of the invention is better understood, the present invention consists in the novel form, combination and arrangement of parts hereinafter more full described, shown in the accompanying drawings, and claimed.

In the drawings:

Figure 1 is a top plan view of a repairing device constructed in accordance with the present invention.

Figure 2 is a side elevational view thereof.

Figure 3 is a bottom plan view of the same.

Figure 4 is a transverse section on line 4—4 of Figure 1.

Figure 5 is a transverse section on line 5—5 of Figure 1.

Figure 6 is a longitudinal section on line 6—6 of Figure 1.

Figure 7 is a view similar to Figure 1 showing the device of the latter figure equipped with means for positioning and applying pressure to a fuelled patch for the purpose of vulcanizing such patch to the tube held by the device of Figure 1.

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

Figure 9 is a plan view of the patch positioning plate forming part of the patch positioning and pressing means shown in Figures 7 and 8.

Figure 10 is a view similar to Figure 9 of a modified form of plate adapted to cooperate with an electrically heated presser plate; and

Figure 11 is a side elevational view of the plate shown in Figure 10 provided with an electrically heated presser plate in accordance with the present invention.

Referring in detail to the drawings, the present invention includes a device for holding an inner tube or similar article in such manner as to permit convenient operation thereon incident to the application of a repair patch. This device includes an elongated base block 5 adapted to have a section or portion of an inner tube T bent thereover as illustrated in Figure 8. A substantially U-shaped clamp has corresponding ends of its legs pivoted on the ends of a pivot pin 6 extending transversely through the base block 5 near one end of the latter. This clamp is adapted to embrace the block and to clamp portions of the tube against the side edges of the block, whereby to hold an intermediate portion of the tube on the upper face of the block as shown in Figure 8. The legs of this clamp consist of angle bar members 7 disposed to present a vertical flange for clamping the tube against the adjacent edge of the base block 5 and a horizontal flange extending outwardly from said vertical flange for a purpose which will presently become apparent. The pivoted ends of the legs are slightly spaced from the adjacent side edges of the base block 5 by means of spacing washers 8, and encircling the projecting ends of pivot pin 6 between heads 9 on the ends of pivot pin 6 and the outer sides of the vertical flanges of the clamp legs or bars 7, are helical compression springs 10 adapted to yieldingly urge the clamp legs or bars 7 toward the side edges of the base block 5 at the pivoted ends of said clamp legs or bars 7. Suitable caps 11 are preferably fitted on the ends of pivot pin 6 for encasing the springs 10.

The U-shaped clamp also includes a transverse connecting or intermediate member 12 in the form of an angle bar disposed transversely of the clamp legs or bars 7 at the opposite ends of the latter, the upper horizontal flange of the transverse member 12 of the clamp projecting inwardly and extending across the upper horizontal flanges of the clamp legs or bars 7 and projecting inwardly a sufficient distance to abut the upper face of base block 5 at the adjacent end of the latter when the clamp is in clamping position, as shown clearly in Figures 2 and 6. Thus the clamp is limited properly in swinging downwardly to operative position for clamping the tube in place after being bent about the base plate 5. The outer vertical flange of transverse clamp member 12 is provided with inwardly projecting lugs 13 which are abutted at their outer sides by the adjacent outer ends of the clamp

legs or bars 7, said outer ends of the clamp legs or bars 7 being yieldingly pressed toward the lugs 13 by means of helical compression springs 14. The lugs 13 have headed pins 15 projecting laterally and outwardly therefrom, and the springs 14 encircle these pins between their heads and the outer sides of the vertical flanges of the clamp legs or bars 7. It will thus be seen that the clamp legs or bars 7 are bodily slidable on the ends of the pivot pin 6 and on the pins 15 toward or away from the side edges of the base plate 5, being yieldingly urged toward the latter by the springs 10 and 14 to set up a gripping action between the vertical flanges of the clamp bars or legs 7 and the side edges of the base plate 5. The clamp is releasably held in downwardly swung operative position by means of a spring pressed latch bolt 16 suitably mounted beneath the upper horizontal flange of transverse clamp member 12 intermediate the ends of the latter and arranged to engage in a keeper opening provided by a recess in the outer end edge of base plate 5 and a slot in a keeper plate 18 secured to said edge of base plate 5. The bolt 16 has a stem slidable through the outer vertical flange of clamp bar 12 and is provided on its outer projecting end with a suitable operating knob 19, the bolt 16 being normally yieldingly spring pressed inwardly to latching position. In order to more positively secure the clamp in operative position after being latched in such position, I may provide a turn button 20 pivoted on the upper end of a bolt 21 extending vertically through the outer end of base plate 5 and adapted to be turned to a position wherein said button overlies the inwardly projecting upper horizontal flange of transverse clamp member 12 as indicated by dotted lines in Figure 6. When the turn button 20 is rotated one quarter turn to the full line position of Figures 1, 2 and 6, it is disengaged from clamp member 12 so as to permit the clamp to be swung upwardly for releasing the inner tube upon release of latch bolt 16. The projecting end portion of base plate 5 near the pivot 6 is provided with openings 22 for reception of bolts 23 whereby the base plate may be securely fastened to the top 24 of a bench or other rigid support. Also, the springs 14 on the pins 15 are preferably encased by caps 25 fitted on said pins 15 similar to the caps 11. To facilitate firm gripping of the tube between the side edges of base plate 5 and the side clamp bars or legs 7, said side edges of base plate 5 are preferably longitudinally fluted or corrugated as indicated at 26. The major outer end portion of base block 5 is provided with a shallow recess in which is secured a metallic plate 27 over which the tube T may be placed in repairing such tube in places other than adjacent the inflation valve of the tube, the plate 27 being able to withstand the heat and pressure incident to vulcanization of a patch and being employed when the base plate 5 is constructed of wood. However, the portion of base plate 5 inwardly of the metal plate 27 is provided with an opening 28 through which the inflation valve of a tube may be extended when a tube is positioned for the application of a repair patch adjacent such inflation valve. Also, the base block 5 is provided in its upper surface and in surrounding relation to the opening 28 with a recess 29 to receive the portion of the tube immediately at the base of the inflation valve where considerable thickness is encountered, thereby permitting the uppermost portion of the tube adjacent the valve to be held flat and smooth under these circumstances. At opposite sides of recess 29, the side edges of base block 5 are provided with vertical grooves to permit passage of the thicker portions of the inner tube adjacent and at opposite sides of the inflation valve, thereby avoiding undue outward displacement of the side clamp bars or legs 7. As the horizontal flanges of side clamp bars or legs 7 are disposed above the pivot pin 6 and pins 15, they will overlie the outer ends of these elements and the springs 10 and 14 so that the latter are effectively protected.

In order to adapt the clamping device for use in the application of heated or vulcanized patches, I provide an attachment such as illustrated in Figures 7 to 9 inclusive or an attachment modified as illustrated in Figures 10 and 11. This attachment consists of a hooked member 31 adapted to be engaged over the upper horizontal flange of one clamp leg or bar 7 and having a supporting plate 32 pivoted thereto at one end of the latter as indicated at 33, for vertical swinging movement. The other end of plate 32 has a pivoted turn button 34 arranged to be engaged beneath or disengaged from the upper horizontal flange of the opposite side clamp bar or leg 7. Thus, the supporting plate may be securely held down against the tube portion extending across the base block 5 and held in this position. It will be seen that the plate 32 is slidable along the side bars or legs 7 to the desired position longitudinally of the clamping device, according to where the tube is clamped on the base block. The plate 32 is provided with intersecting elongated openings 35 and 35a respectively adapted for selective reception of a fuelled patch 36 in either of two positions extending at right angles to each other. Thus, provision is made for properly positioning the patch according to the requirements of different conditions. A fuelled patch, as is well known in the art, consists of a pan 37 containing a quantity of fuel 38 and having the patch 36 applied to the bottom thereof, the fuel 38 being adapted to be ignited for generating heat which causes vulcanization of the patch 36 to the tube. The openings 35 and 35a are each of a shape and size to snugly receive the pan 37 but to permit free downward displacement thereof in applying the desired pressure of the patch 36 against the clamp portion of the tube. For applying this pressure, I provide an apertured pressure plate 39 having inwardly projecting lugs 40 at suitable points about its aperture arranged to engage over the upper edge of the pan 37. The presser plate 39 is slidably mounted for vertical movement on upstanding pins 41 carried by the supporting plate 32, springs 42 encircling pins 41 between the presser plate 39 and nuts or heads 43 provided on the upper ends of said pins 41, whereby the presser plate 39 is yieldingly urged downwardly for exerting the desired pressure upon the patch 36 during the vulcanizing operation. When the patch has been applied, the turn button 34 is simply released from the adjacent clamp bar or leg 7 and swung upwardly about the pivot 33. The hook member 31 may then be disengaged from the other clamp bar or leg 7, whereupon the U-shaped clamp may be unfastened and swung upwardly about the pivot pin 6 for releasing the tube and permitting its removal from the base block 5.

In some cases, it is desired to use an ordinary patch vulcanized by the heat of an electrically heated presser plate. In that case, the hook

member 31 is provided with a supporting plate 32a in place of the plate 32, said plate 32a having the turn button 34a at one end and being provided with a hinge knuckle 44 at the other end for reception of the pivot pin 33 of said hook member 31. In other words, the plate 32a is simply substituted for the plate 32 and presser plate 39 of Figures 7 and 8, the plate 32a having a rectangular or other shape opening 45 of a size to receive the reduced bottom portion 46 of an electrically heated presser unit 47. This unit 47 has lugs 48 through which pins 41a slidably extend, the pins 41a being encircled by springs 42a whereby the unit 47 is yieldingly urged downwardly for pressing the patch against the tube during the heating and vulcanizing operation. In each instance the springs 42 or 42a are engaged by suitable protecting caps 49.

The operation or use of the present invention has been clearly and fully described as the description of the construction progressed. Accordingly, it is believed that such operation, as well as the advantages of the present invention, will be readily appreciated and understood by those skilled in the art. It will be seen that I have provided an extremely simple and efficient repairing device which may be most conveniently manipulated. While I have shown specific construction and modifications, it will be apparent that the invention is susceptible to various other changes and modifications without departing from the spirit of the invention as claimed. The vulcanizing device for "fuelled" patches is also adapted to receive round or square patches of such size as fit in under the four central lugs 40 of the pressure plate 39, the size of such patch being limited by the size of the central part of the opening in the plate 32.

What I claim as new is:

1. An inner tube repairing device including a flat rectangular base block, and a substantially U-shaped clamp adapted to embrace the sides and one end of the block and having the free ends of its legs pivoted to the block adjacent its other end, said clamp including spaced legs and an intermediate transverse member made of angle bars, the legs of said clamp being slidable on the pivot and slidably connected to the ends of said intermediate transverse member for bodily movement toward and away from the sides of the base block, and yieldable means at both ends of the clamp legs for urging said clamp legs toward the sides of said base block, the clamp legs being disposed to present vertical flanges for clamping the tube against the sides of the base block and horizontal flanges projecting outwardly from the upper edges of said vertical flanges.

2. In an inner tube repairing device, a base block, a substantially U-shaped clamp adapted to embrace the sides and one end of the block and having the free ends of its legs pivoted to the block adjacent its other end, said legs of the clamp being of angle bar form having upper outwardly projecting horizontal flanges, and a patch pressing device removably and slidably engaging said horizontal flanges of the legs.

3. In an inner tube repairing device, a base block, a substantially U-shaped clamp adapted to embrace the sides and one end of the block and having the free ends of its legs pivoted to the block adjacent its other end, said legs of the clamp being of angle bar form having upper outwardly projecting horizontal flanges, and a patch pressing device removably and slidably engaging said horizontal flanges of the legs, said pressing device including a hook member engageable with the horizontal flange of one leg, an apertured plate hinged to said hook member and having a turn button releasably engageable with the horizontal flange of the other leg.

4. In an inner tube repairing device, a base block, a substantially U-shaped clamp adapted to embrace the sides and one end of the block and having the free ends of its legs pivoted to the block adjacent its other end, said legs of the clamp being of angle bar form having upper outwardly projecting horizontal flanges, a patch pressing device removably and slidably engaging said horizontal flanges of the legs, said pressing device including a hook member engageable with the horizontal flange of one leg, an apertured plate hinged to said hook member and having a turn button releasably engageable with the horizontal flange of the other leg, and a downwardly spring pressed presser plate carried by said first-named plate and arranged to exert downward pressure on a patch disposed in registry with the opening of said first-named plate.

5. In an inner tube repairing device, a base block, a substantially U-shaped clamp adapted to embrace the sides and one end of the block and having the free ends of its legs pivoted to the block adjacent its other end, said legs of the clamp being of angle bar form having upper outwardly projecting horizontal flanges, and a patch pressing device removably and slidably engaging said horizontal flanges of the legs, said pressing device including a hook member engageable with the horizontal flange of one leg, an apertured plate hinged to said hook member and having a turn button releasably engageable with the horizontal flange of the other leg, said plate having intersecting elongated openings adapted for snug reception of a fuelled patch in either desired one of two angularly related positions.

6. In an inner tube repairing device, a base block, a substantially U-shaped clamp adapted to embrace the sides and one end of the block and having the free ends of its legs pivoted to the block adjacent its other end, said legs of the clamp being of angle bar form having upper outwardly projecting horizontal flanges, a patch pressing device removably and slidably engaging said horizontal flanges of the legs, said pressing device including a hook member engageable with the horizontal flange of one leg, an apertured plate hinged to said hook member and having a turn button releasably engageable with the horizontal flanges of the other leg, said plate having intersecting elongated openings adapted for snug reception of a fuelled patch in either desired one of two angularly related positions, and spring pressed means for exerting a downward pressure on the fuelled patch in either of said positions.

7. In an inner tube repairing device, a base block, and a substantially U-shaped clamp adapted to embrace the sides and one end of the block and having the free ends of its legs pivoted to the block adjacent its other end, said clamp including a transverse intermediate member having lateral pins, the legs of said clamp being slidable on said pins and their pivot for movement toward and away from the sides of the base block, and springs on said pins and pivot yieldably urging the legs of the clamp toward the sides of said block.

8. In an inner tube repairing device, a base block, a substantially U-shaped clamp adapted to embrace the sides and one end of the block and

having the free ends of its legs pivoted to the block adjacent its other end, said clamp including a transverse intermediate member having lateral pins, the legs of said clamp being slidable on said pins and their pivot for movement toward and away from the sides of the base block, and springs on said pins and pivot yieldably urging the legs of the clamp toward the sides of said block, the legs and transverse intermediate members of the clamp being of angle bar form, said legs being disposed to present inner vertical flanges and upper horizontal outwardly projecting flanges, the intermediate transverse member of the clamp being disposed to present an outer vertical flange and an upper inwardly projecting horizontal flange extending across the horizontal flanges of the legs, said horizontal flanges of the legs and transverse member overlying the pins and pivot of the clamp.

9. In an inner tube repairing device, a base block, a substantially U-shaped clamp adapted to embrace the sides and one end of the block and having the free ends of its legs pivoted to the block adjacent its other end, said clamp including a transverse intermediate member having lateral pins, the legs of said clamp being slidable on said pins and their pivot for movement toward and away from the sides of the base block, springs on said pins and pivot yieldably urging the legs of the clamp toward the sides of said block, the legs and transverse intermediate members of the clamp being of angle bar form, said legs being disposed to present inner vertical flanges and upper horizontal outwardly projecting flanges, the intermediate transverse member of the clamp being disposed to present an outer vertical flange and an upper inwardly projecting horizontal flange extending across the horizontal flanges of the legs, said horizontal flanges of the legs and transverse member overlying the pins and pivot of the clamp, and latching means carried by said transverse clamp member and engageable with the adjacent end of the base block for releasably holding the clamp in downwardly swung operative position.

LEE KENDALL.