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APPARATUS FOR REPAIRING AND TESTING RADIATORS

Filed April 23, 1951

3 Sheets-Sheet 2

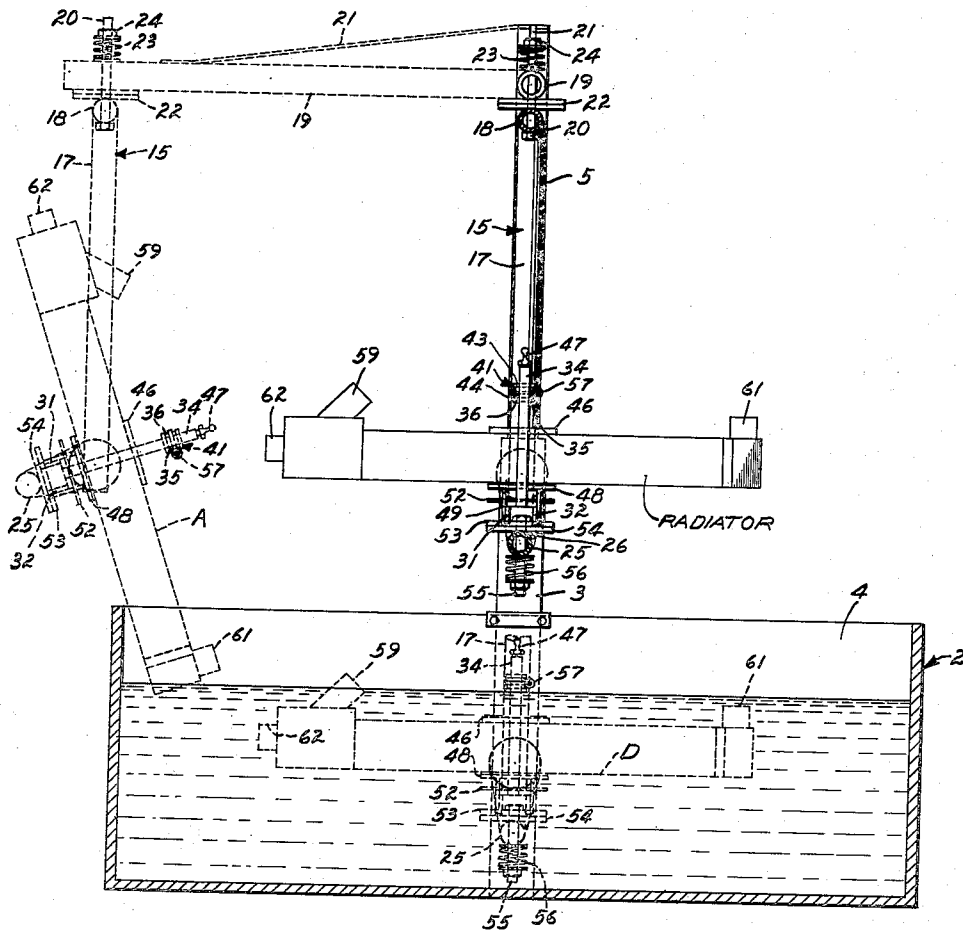


FIG. 3

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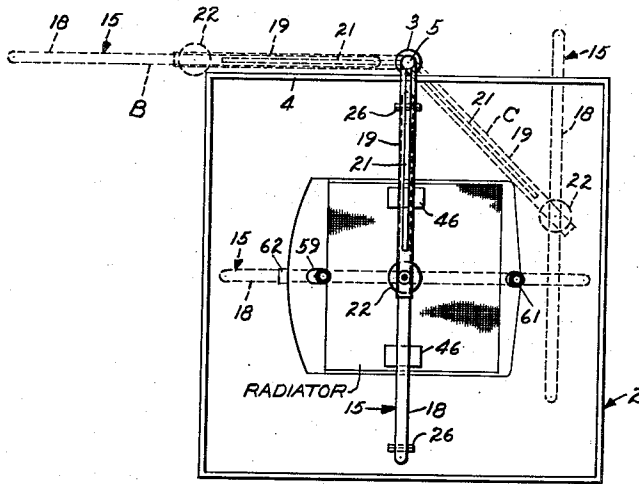


FIG. 5

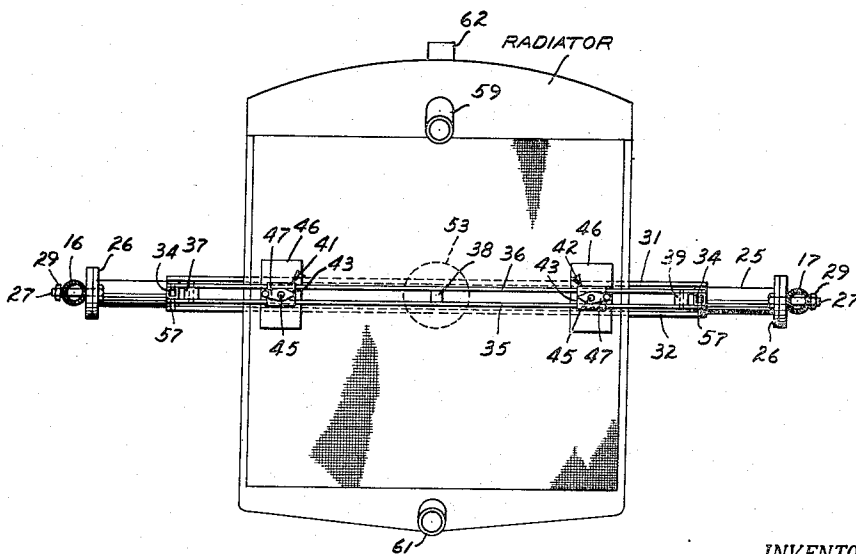


FIG. 4

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APPARATUS FOR REPAIRING AND TESTING RADIATORS

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2 Claims. (Cl. 29—290)

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This invention relates to new and useful improvements in apparatus for facilitating the operation of repairing and testing automobile radiators.

It is well known that a leaky radiator cannot always be repaired while in its usual position in the automobile. It is therefore customary to remove the radiator, especially when the tubes of the radiator core become leaky, in order that access may be had to the leaky tubes for the purpose of making repairs thereto, and also to facilitate testing the radiator for leaks, and it is an object of the present invention to provide an apparatus for supporting a radiator, whereby access may be had to all parts thereof, while secured in position in the apparatus.

A further object is to provide an apparatus of this general type comprising a support mounted for universal movement and having means for securing a radiator therein, whereby the radiator may readily be rotated about horizontal and vertical axes, to facilitate positioning the radiator whereby a mechanic may readily and conveniently repair the leak, and also whereby the radiator may be rotated in said support to facilitate the inspection thereof.

A further object of the invention is to provide an apparatus of the class described comprising means for supporting a radiator whereby it is adapted for universal movement, and a tank being positioned adjacent to said support whereby the radiator may readily be lowered into the water in the tank for the purpose of locating leaks, it being understood that air under pressure is introduced into the radiator prior to submerging it in the water.

A further object resides in the unique construction of the radiator supporting device and in the pivotal mounting thereof in its supporting frame, whereby when a radiator core is supported in the apparatus and the radiator supporting device is rotated in its horizontal axis, the weight of the radiator core will counterbalance the weight of its supporting structure.

Other objects of the invention reside in the novel construction and arrangement of the radiator supporting frame, whereby the radiator may be rotated to any desired position and also whereby said frame with the radiator positioned therein, may be swung as a unit about a vertical axis to facilitate positioning the radiator in the clamping means or removing it therefrom, and also whereby the operation of inspecting the radiator is facilitated; in the construction of the fluid operated means for raising or lowering the radi-

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ator supporting frame; and in the friction means provided for frictionally retaining the radiator clamping means and radiator in any desired position to facilitate making repairs thereto.

These and other objects of the invention and the means for their attainment will be more apparent from the following description taken in connection with the accompanying drawings.

In the accompanying drawings there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown, as various changes may be made within the scope of the claims which follow.

In the drawings:

Figure 1 is a front elevation of the apparatus showing a radiator supported therein in a position over the tank;

Figure 2 is a sectional plan view on the line 2—2 of Figure 1, showing the link connections between the lower clamping elements;

Figure 3 is a sectional elevation on the line 3—3 of Figure 1, the full and dotted lines indicating the radiator in different positions;

Figure 4 is a horizontal sectional view on the line 4—4 of Figure 1, showing a radiator supported in the apparatus; and

Figure 5 is a plan view of the apparatus on a relatively smaller scale, illustrating how the supporting frame may be swung to different positions over the tank or to a position to one side thereof.

The novel apparatus herein disclosed is shown comprising a suitable tank 2 adapted to contain a liquid such as water, of a depth sufficient to submerge a radiator core therein for the purpose of testing the radiator for leaks, as will subsequently be described.

An upright cylinder 3 is shown mounted adjacent to the wall 4 of the tank, and has a plunger 5 mounted for vertical movement therein. The plunger is shown provided at its lower end with a piston 6 which may be in the form of a cup-packing, well known in the art. A head or cap 7 is secured to the upper end of cylinder 3 to provide a closure therefor, and also to provide a bearing for the plunger 5 in its up and down movements. The cup packing 6 is shown secured to the lower end of the plunger 5 by a suitable bolt 8, which preferably extends below the flange of the piston packing for the purpose of providing an abutment or stop for the downward movement of the plunger 5. In other words, the lower terminal of bolt 8 is adapted to engage the bot-

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tom wall 9 of the cylinder 3 to limit the downward movement of the plunger, as when the radiator core is submerged in the water in the tank.

The cylinder 3 below the piston 6 is filled with a suitable pressure fluid such as oil, which controls the raising and lowering of the plunger 5 in the cylinder 3. Positioned adjacent to the cylinder 3 is an auxiliary cylinder 11 having a bypass 12 for establishing connection between the lower end of the cylinders, whereby the liquid in the lower end of cylinder 3 may flow back and forth between the two cylinders in the operation of the apparatus. In Figure 1, the portion of the cylinder 3 below the piston 6 is shown filled with oil, and it will also be noted that the lower portion of cylinder 11 is filled with oil to a position slightly above the bypass 12. The remaining portion of cylinder 11 between the oil level therein and the top end thereof contains air under pressure delivered thereto through a conduit 13 having a suitable control valve 14 interposed therein. The control valve is of conventional design and when operated in one direction, permits air under pressure to enter the upper end of cylinder 11, thereby to force the liquid downwardly therein and into the lower end of cylinder 3 to raise the plunger 5 to the position shown in Figure 1.

When the control valve is operating in the opposite direction, air is released from the upper end of cylinder 11, whereby the plunger moves downwardly in the cylinder 3 by gravity. During such downward movement of the plunger, the oil in the cylinder 3 is bypassed back in the lower end of cylinder 11, and as the oil level therein ascends, air is released to the atmosphere from the upper end of cylinder 11 through the control valve 14, as will be understood. The raising and lowering of the plunger 5 may therefore be conveniently controlled by manipulation of the control valve 14.

The means for supporting the radiator is shown comprising a U-shaped frame 15, preferably of tubular stock, comprising spaced arms 16 and 17 having their upper ends fixedly secured to a horizontal member 18. A pivot bolt 20 pivotally connects the frame 15 to the outer end of an arm 19 secured to the upper end of plunger 5, as shown in Figure 1. A suitable brace 21 is shown having one end secured to the upper end of the plunger and its opposite end to the arm 19 to prevent the outer end of said arm from sagging under a load.

Enlarged bearing plates 22 are secured respectively to the upper frame member 18 and the arm 19 to provide friction surfaces which are retained in frictional engagement with one another by a suitable spring 23, adjustably supported on the upper end of the bolt 20 by an adjusting nut 24.

A horizontal member 25 is shown provided at its ends with upright elements 26 which are pivotally connected to the spaced arms 16 and 17 of the frame 15 by pivots 27. Springs 28 are coiled about the pivot bolts 27 and are tensioned by manipulation of the nuts 29 of the pivot bolts 27, whereby said springs frictionally restrain the horizontal member 25 against pivotal movement about the axis $a-a$, formed by the pivot bolts 27.

Means is provided for clamping the radiator in position on the horizontal member 25, and is shown comprising a pair of spaced parallel bars 31 and 32 having their ends secured to the lower ends 33 of a pair of upright posts 34 adapted to support a second pair of spaced bars or rails 35

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and 36, as will be understood by reference to Figures 1 and 4. Spacing blocks 37, 38 and 39 retain the rails 35 and 36 in spaced relation, as best illustrated in Figure 4.

Slides 41 and 42, each having vertically spaced flanges 43 and 44, are slidable on the upper rails 35 and 36, and each carries a clamping screw 45 provided at its lower end with a clamping element or plate 46. Each screw 45 has an operating handle 47 secured to its upper end to facilitate rotation thereof, when securing a radiator in position in the apparatus. The clamping plates 46 are pivotally connected to the lower ends of the adjusting screws 45 to prevent relative rotation thereof when the clamping screws are manipulated.

A pair of lower clamping plates 48 are secured to slides 49 mounted for traveling movement upon the lower spaced bars 31 and 32 in opposite directions, as a result of links 51 connecting said slides with a centrally disposed link 52 pivoted to an anchor element 53 secured to the spaced bars 31 and 32. Friction disks 53 and 54 are secured respectively to the bars 31-32 and the lower horizontal member 25 of the radiator supporting means. A pivot bolt 55 rotatably secures the spaced clamping bars 31 and 32 to the lower frame member 25, as will be understood by reference to Figure 1. A suitable spring 56 is shown coiled about the pivot bolt 55 and serves to frictionally retain the circular disks 53 and 54 in engagement with each other to frictionally restrain the clamping bars 31 and 32 against rotary movement about the axis of the pivot bolt 55.

From the foregoing it will be noted that the radiator when clamped between the clamping elements 46 and 48 by manipulation of the operating handle 47, may be universally adjusted to any desired position or angle to suit the convenience of the mechanic who is to inspect the radiator or make repairs thereto. The aligned pivot bolts 27 permit the radiator while clamped in the apparatus to rotate about the horizontal axis $a-a$, as will be understood by reference to Figure 3, wherein the dotted lines A indicate the radiator when rotated to a substantially upright position.

The vertically aligned pivot bolts 20 and 55 cooperate to provide a vertically disposed axis $b-b$, about which the radiator may be rotated in a horizontal plane as will be understood by reference to Figure 5. The telescoping engagement of the plunger 5 with the cylinder 3 also provides a vertical axis $c-c$ about which the U-shaped frame 15 with a radiator supported in the lower portion thereof, may be swung to either side of the tank, as indicated by the dotted line positions B and C in Figure 5.

In the operation of the novel apparatus herein disclosed, the upper bars 35-36 are detached from the posts 34 as a unit, by withdrawal of the pins 57. The radiator to be repaired or tested is then placed upon the lower clamping element 48, after which the upper bars 35-36 are engaged with the posts 34, as shown in Figure 1. A plurality of spaced apertures 58 are provided in the posts 34 to expedite the operation of engaging the upper clamps 46 with the radiator, as will be understood. The apertures 58 also provide adequate up and down adjustment of the clamping bars 35 and 36 to adapt the apparatus for radiator cores of varying thicknesses.

After a radiator core has been secured in position between the clamping elements 46 and 48, as illustrated in the drawings, the radiator may

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be rotated in any desired direction by reason of the universal mounting of the clamping elements upon the upper horizontal arm 19 of the plunger 5. All pivotal connections embody friction means whereby the radiator may be retained in any desired position without supplemental securing elements.

After the damaged portion of the radiator has been repaired, low pressure air may be introduced into the radiator by suitable means not shown, and the radiator is then lowered into the tank and submerged in the water therein, as indicated at D in Figure 3. Before air is introduced into the radiator, the intake and discharge connections 59 and 61 thereof are closed by suitable caps not shown in the drawing, and a fitting is applied to the filler neck 62 of the radiator to which one end of an air hose may be connected for the introduction of air into the radiator core. If no leaks are noted, the radiator may be removed from its supporting clamps 43 and 48 by elevating it to the position shown in Figure 1, and laterally swinging the radiator and its supporting means to a position clear of the tank 2, or to a position whereby the radiator may be readily removed from its support, as will be understood by reference to Figure 5.

The novel apparatus herein disclosed is capable of accommodating radiator cores of practically all sizes. The removability of the clamping bars 35—36 provides an important feature of the invention in that it makes it possible to quickly place a radiator core in the apparatus and secure it in position therein, regardless of size. The spaced apertures 58 make it possible to shorten the length of the adjusting screws 45 and also reduces to a minimum the number of rotations required of said adjusting screws when securing a radiator in position in the apparatus or removing one therefrom. The up and down movement of the clamping means is controlled entirely by manipulation of the single air control valve 14, and there is substantially no loss of the pressure fluid in the main cylinder 3 because of said fluid being completely confined therein.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be constructed as broadly as permissible in view of the prior art.

I claim as my invention:

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1. In an apparatus for repairing automobile radiators, an upright tubular standard having a member mounted telescopically therein and adapted for vertical adjustment, said vertically adjustable member having a laterally extending arm secured to its upper end portion, an enlarged downwardly facing bearing plate secured to the outer end of said laterally extending arm, an inverted U-shaped member comprising an upper horizontal member having an enlarged upwardly facing bearing plate secured to the intermediate portion thereof adapted to be seated against the downwardly facing bearing plate of said arm, said upper horizontal member, bearing plates, and said lateral arm being apertured to receive a pivot bolt for pivotally mounting the U-shaped member on said arm, spring means engaged with said bolt and arm for frictionally retaining said bearing plates in engagement with one another and permitting rotary movement of the U-shaped member relative to said arm, said U-shaped member being provided at its opposed ends with pivotally mounted, downwardly extending legs, a lower horizontal member secured to one end of each of said legs, a radiator supporting mechanism pivotally mounted on the intermediate portion of said lower horizontal member to rotate on a vertical axis, all of the said pivotal mountings cooperating to provide a universal support for the radiator, whereby the radiator may be tilted to any desired position to facilitate work operations.

2. An apparatus according to claim 1 wherein hydraulic means is embodied in said upright standard for vertically adjusting the arm supporting member therein.

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