Feb. 28, 1956 S. A. CHILTON 2,736,169

HYDROPNEUMATIC SYSTEM FOR RADIATOR REPAIR LIFT

Filed March 7, 1951 3 Sheets-Sheet 1

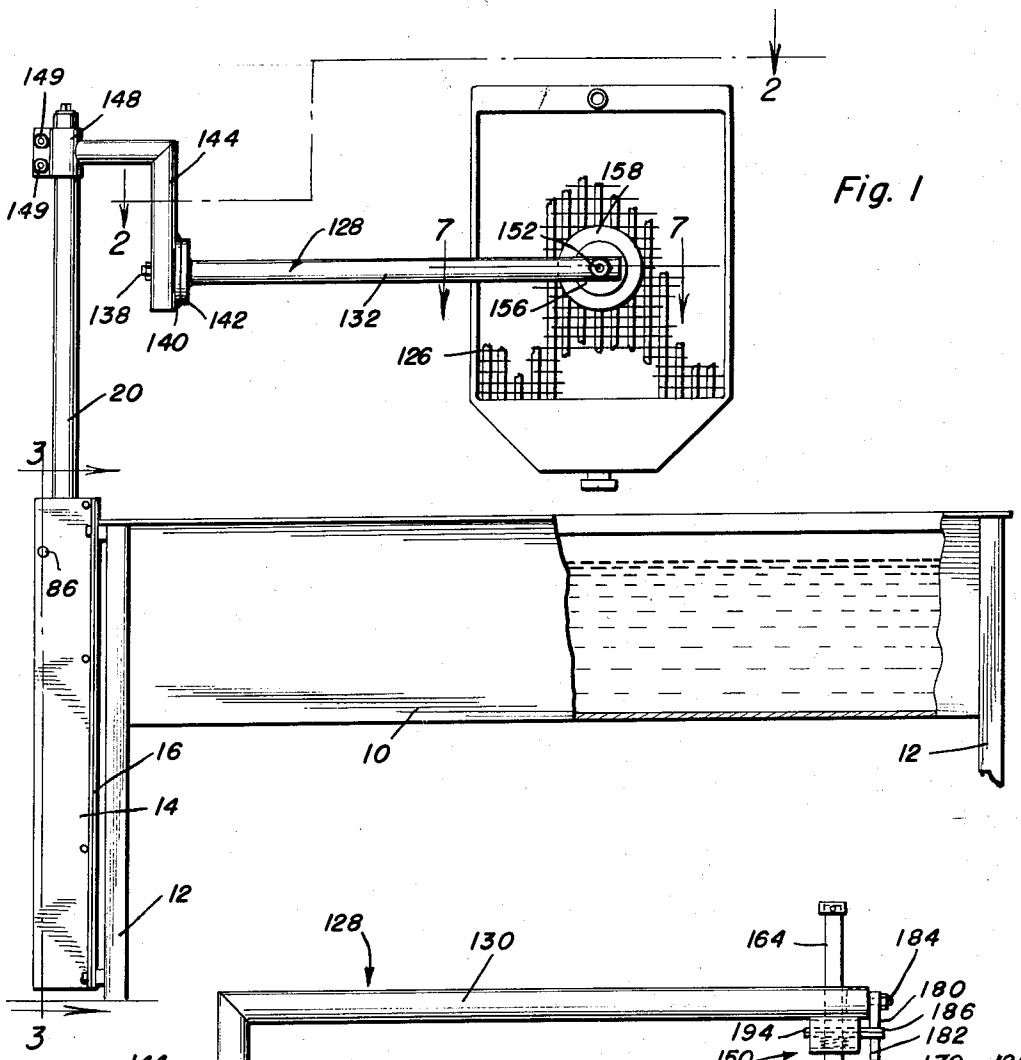


Fig. 1

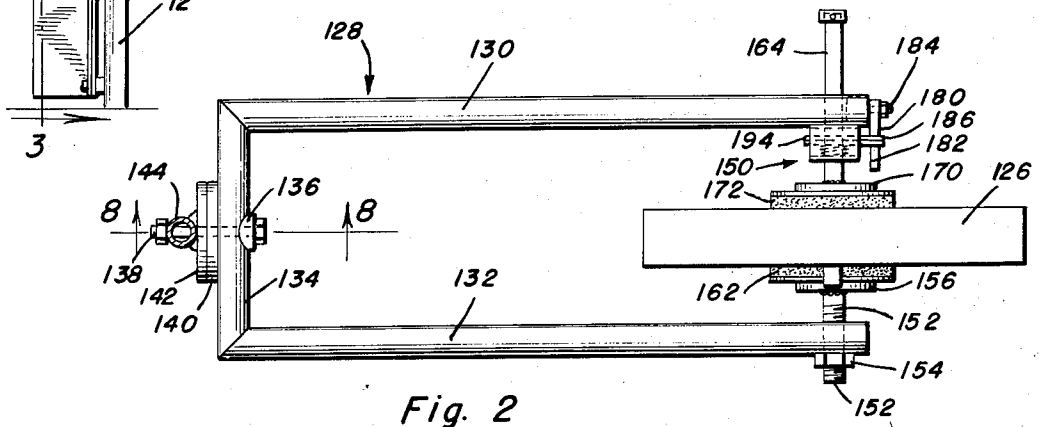


Fig. 2

Samuel A. Chilton
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

Feb. 28, 1956 S. A. CHILTON 2,736,169

HYDROPNEUMATIC SYSTEM FOR RADIATOR REPAIR LIFT

Filed March 7, 1951 3 Sheets-Sheet 2

Fig. 3

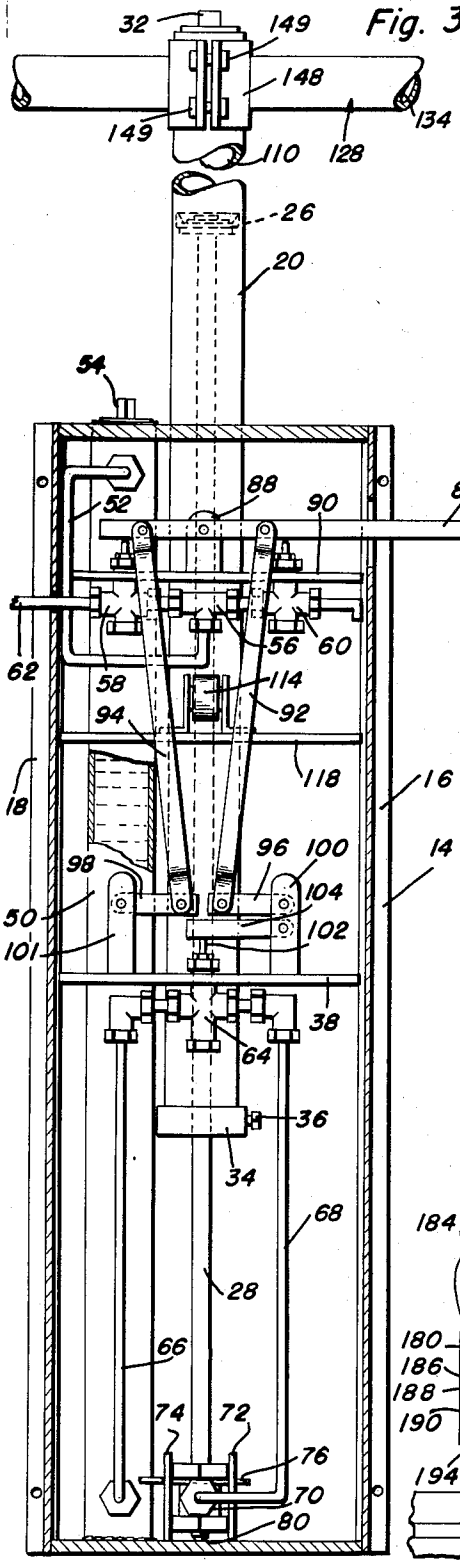


Fig. 7

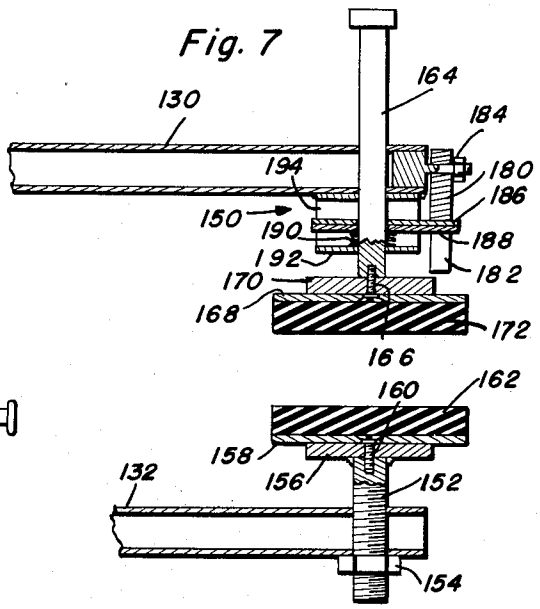


Fig. 8

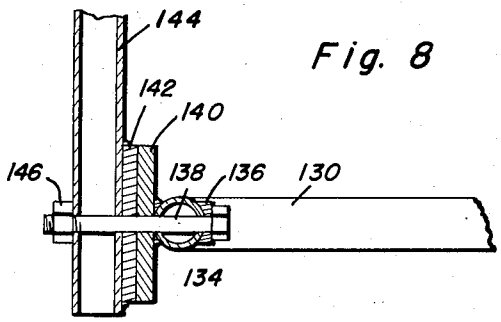
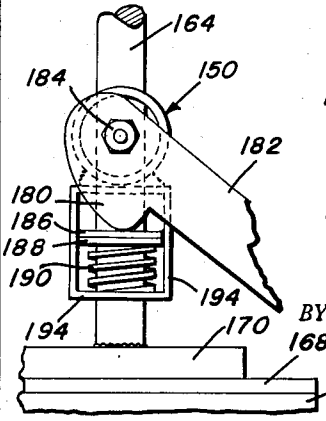


Fig. 9



Samuel A. Chilton
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jackson
Attorneys

Feb. 28, 1956 S. A. CHILTON 2,736,169

HYDROPNEUMATIC SYSTEM FOR RADIATOR REPAIR LIFT

Filed March 7, 1951 3 Sheets-Sheet 3

Fig. 4

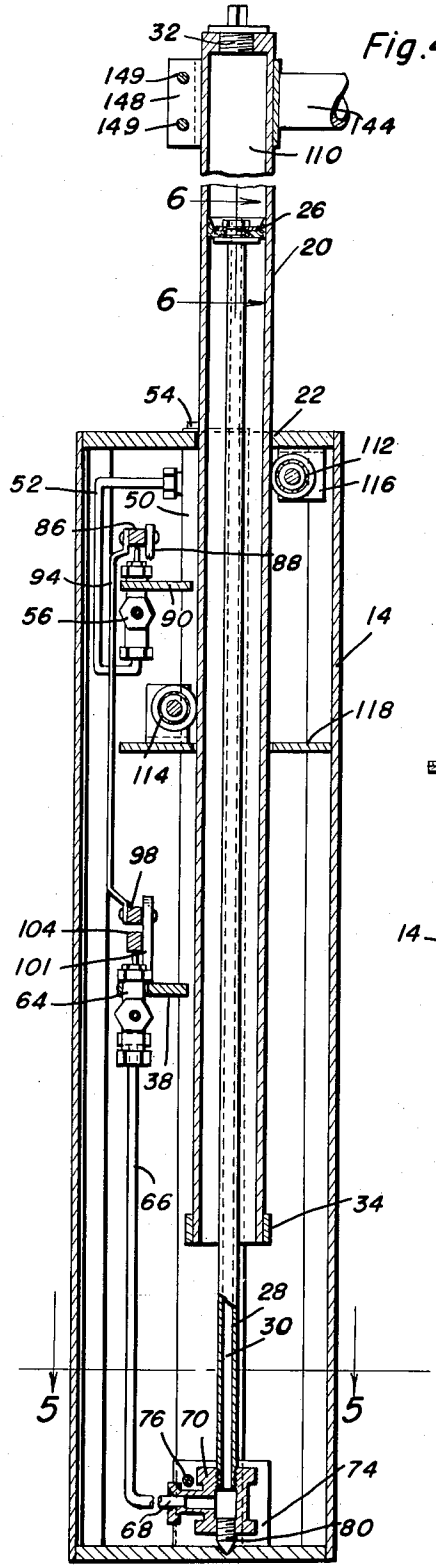


Fig. 6

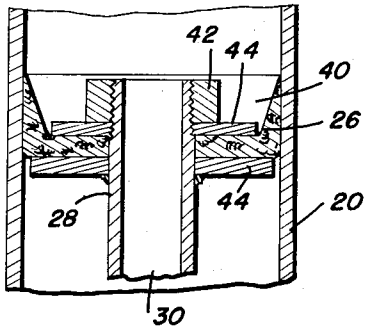
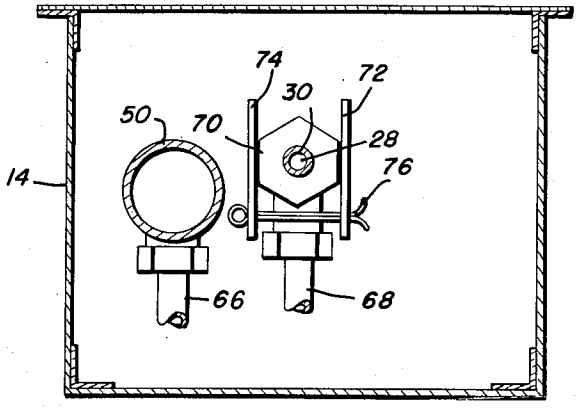


Fig. 5



Samuel A. Chilton

INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

United States Patent Office

2,736,169

Patented Feb. 28, 1956

2,736,169

HYDROPNEUMATIC SYSTEM FOR RADIATOR REPAIR LIFT

Samuel A. Chilton, Suffolk, Va., assignor of one-half to R. R. Harrell, Jr., Suffolk, Va.

Application March 7, 1951, Serial No. 214,376

2 Claims. (Cl. 60—51)

This invention relates to an improved device for handling a radiator for repair purposes.

An object of the invention is to provide an improved device particularly adapted to be located adjacent to a submersion tub, the device being capable of supporting a radiator core in various selected positions for facility of soldering, and the device embodying a novel means of actually clamping the radiator core together with an improved means of lifting the radiator core, the lifting means employing a combination air and liquid system for performing the lifting operation.

A further object of the invention is to provide an improved control mechanism for the lifting means, the control mechanism including a single handle adapted to be actuated whereby upon movement of the handle in one direction an air intake valve and a liquid control valve is opened, but upon operation of the handle in the opposite direction, the same liquid control valve is opened but in lieu of the air intake valve, an air exhaust valve is opened thereby allowing the trapped fluid to return to its storage tank and allowing the air which was used to urge the fluid from the tank to serve its lifting function, to be released.

Ancillary objects and features of importance will become apparent in following the description of the illustrated form of the invention.

In the drawings:

Figure 1 is an elevational view of the device with a portion of the submersion tank broken away in section;

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1 and in the direction of the arrows;

Figure 3 is an enlarged sectional view with parts being shown in elevation and taken substantially on the line 3—3 of Figure 1 and in the direction of the arrows;

Figure 4 is a longitudinal sectional view of the structure shown in Figure 3;

Figure 5 is a transverse sectional view in enlarged scale and taken substantially on the line 5—5 of Figure 4;

Figure 6 is an enlarged fragmentary sectional view taken on the line 6—6 of Figure 4 and in the direction of the arrows;

Figure 7 is an enlarged sectional view taken on the line 7—7 of Figure 1 and in the direction of the arrows, the standard radiator core being omitted;

Figure 8 is an enlarged sectional view taken on the line 8—8 of Figure 2 and in the direction of the arrows; and

Figure 9 is a fragmentary elevational view of a part of the radiator core clamp.

In repairing the core of a radiator, after it has first been cleaned, it is first necessary to have a standard means of putting air under a small pressure in the core and immersing it in water in order to locate any holes. The radiator is then taken out of the water and the holes soldered. This checking for leaks and soldering holes is continued until the radiator is watertight. It is quite a difficult task to handle the radiator and put it into and remove it from a tub of water, and each time placing it in a position where it can be soldered conveniently.

The instant invention has been designed to remove a large amount of the labor involved in repairing a radiator core by handling the radiator, moving it up and down in the submersion tank by a combination of mechanical and hydraulic means. The instant invention also acts as a jig for holding the radiator core so that it can be put in any desired position or angle for quick and easy soldering.

Attention is first invited to Figure 1 where there is disclosed a submersion tank 10 of standard construction and supported by legs 12. A housing 14 is fastened to one pair of legs 12 by any standard means, as bolts passing through flanges 16 and 18 on the sides of the housing and connecting to brackets which are carried by the legs 12. A vertically disposed support 20 is slidable through an opening 22 in the top of the housing 14 and is hollow to constitute a cylinder. A piston including a piston head 26 is disposed in the cylinder and the piston also includes a piston rod 28. The piston rod and head 20 is provided with a longitudinal passage 30 which opens into the upper part of the support 20, the top wall thereof being provided with an opening closed by a threaded plug 32 for access into the interior of the support. The lower end of the support has a collar 34 fastened to it by means of a set screw 36 whereby the collar may be adjusted longitudinally of the support 20. The collar serves as a stop inasmuch as it is adapted to contact a mounting plate 38 located in and fastened to the housing 14 to thereby prevent excessive movement of the support 20 outwardly of the housing 14.

Attention is now invited to Figure 6 which illustrates the specific construction of the piston 26, the piston including a leather or other suitable material cup 40 concentrically arranged with respect to the piston rod 28 and held in place by means of a nut 42 which is threaded on the outer end of the rod 28 and which bears against a washer 44 located between the cup 40 and nut 42. A lower washer 44 is welded or otherwise fastened to the piston rod below the washer to constitute a seat for the cup.

There is a means provided for raising the support 20, the support 20 adapted to be gravitationally lowered. The elevating means comprises a storage tank 50 which contains a liquid, as oil or water having a rust preventative therein. The storage 50 is fastened to the bottom of the housing 14 and has an air inlet conduit 52 connected therewith near the top thereof. A filler plug 54 is located at the top of the tank 50, being accessible through the top of the housing 14. The air inlet line 52 connects with a T-fitting 56, the T-fitting having an air inlet control valve 58 connected with one side thereof and an air exhaust valve 60 connected with the other side thereof. The air inlet valve 58 is fastened to a line 62 which is adapted to conduct air under pressure from a suitable standard source.

There is a liquid conductor 66 connected with the bottom of the tank 50 which communicates with a two-way valve 64, this valve having a pipe 68 extending therefrom which opens into a small casing 70. This small casing is located between a pair of plates 72 and 74 which are welded or otherwise rigidly fastened to the bottom of the housing 14 and there is a pin 76 passed through aligned openings in the plates 72 and 74, the pin being located above a part of the casing 70 in order to retain it between the plates 72 and 74. A centering pin 80 is carried by the lower wall of the casing 70 and located in an upwardly opening recess to further assist in holding the casing 70 centered at the bottom of the housing 14. The lower end of the piston rod 28 opens into the chamber provided in the casing 70, whereby the casing together with its feed line 68, the valve 64 and the liquid conductor 66 constitute a valve control means for estab-

lishing communication between the tank 50 and the passage 30.

There is a single handle 86 pivoted intermediate its ends to one or more mounting brackets 88 carried by a horizontal partition 90 in the housing 14. Means are provided in association with the handle 86 so that when the handle is lifted the support 20 by the action of the air and liquid system, is extended with respect to the housing, and when the handle 86 is lowered the air and fluid is suitably released so as to allow the support 20 to be gravitationally lowered. This means comprises links 92 and 94 respectively which are pivoted at their upper ends to spaced places on the handle 86 on each side of the pivotal connection with the mounting bracket 88. The opposite ends of the links are pivoted to arms 96 and 98, respectively, these arms being pivoted to supports 100 and 101 which are carried by the plate 38, this plate also having a stop function when contacted by the stop collar 34 as described previously. The operating rod 102 of the valve 64 has a lever 104 resting thereon, the lever being mounted on the bracket 100 for pivotal movement and being in the line of travel of the arms 96 and 98. The handle 86 is so disposed that when it is lifted the outer end thereof contacts the push rod of the valve 58 and when it is lowered the intermediate portion of it contacts the push rod of the valve 60.

In operation of this portion of the device, when the handle 86 is lifted so as to cause the support 20 to be lifted, the valve 58 is opened thereby permitting air under pressure to enter the T-fitting 56. Since the valve 60 is a two-way valve and is normally closed, the air passes through the air conductor 52 and enters the top part of the tank 50. This pushes the liquid which is stored in the tank through the conductor 66 and into the valve 64.

At the time that the handle 86 was lifted, the link 92 was elevated and the link 94 lowered thereby contacting the lever 104 and pushing the valve operator 102 so as to open the valve 64. Hence, the liquid passing through the conductor 66 goes through the two-way valve 64 which is now opened, and passes into the casing 70 through the line 68. Entering the casing under pressure, the liquid rises through the passage 30 and enters the chamber 110 which is defined by the upper end of the support 20 above the piston 26. Inasmuch as the top part of the cylinder is closed by the filler plug 32, the support 20 is elevated.

When the handle 86 is lowered to a neutral position as disclosed in Figure 3, any residual pressure may be relieved by operating the handle downwardly for a short duration. Normally this residual pressure might tend to continue to raise the support 20.

When it is desired to permit the support 20 to be lowered by the force of gravity, this movement together with the raising movement of the support 20 is done smoothly inasmuch as there are anti-friction rollers 112 and 114 (Figure 4) contacting the side walls of the support. The anti-friction roller 112 is carried by a suitable bracket 116 fixed to the housing, while the anti-friction roller 114 is located on a horizontal partition 118 disposed in the housing 14.

The handle 86 is depressed thereby separating the outer end thereof from the normally closed valve 58. Accordingly, no additional air under pressure can enter the T-fitting 56. However, when the handle 86 was depressed, the valve operator for the valve 60 is actuated thereby opening the valve 60 and allowing any pressure in the T-fitting 56 to be relieved. This pressure relief exhausts the air under pressure which is above the liquid in the tank 50, permitting additional liquid to enter the tank. This additional liquid comes from the chamber 110, extending through the passage 30, the casing 70, the conductor 68 and valve 64 which has been opened by depression of the lever 104 as urged by the arm 96 which is actuated by the link 92. Inasmuch as the valve 64 is opened at this time, the liquid can return into the bottom of the tank through the conductor 66.

In order to support the radiator core 126 in any selected adjusted position, a yoke 128 is provided, this yoke including sides 130 and 132 connected to a cross member 134. This cross member (Figure 8) has a plate 136 welded to one side thereof to constitute a seat for the head of a pivot bolt 138. This pivot bolt extends through aligned apertures in the plates 140 and 142, the plate 140 being welded to the cross member 34 and the plate 142 being welded to a pipe section 144. By tightening a nut 146 a proper amount the plates 140 and 142 rubbing against each other and in frictional contact with each other provide a friction lock so that when the yoke is rotated about a horizontal axis it remains in that position.

The pipe section 144 has a split clamp 148 at the end thereof through which bolts 149 pass so as to hold the split bearing or clamp in any position on the support 20, that is rotationally adjusted positions or axially extended or retracted positions on the support.

The sides 130 and 132 are provided at their outer ends with an improved clamp 150 to releasably engage the radiator core 126. For the specific construction of this improved clamp 150, attention is invited principally to Figures 2, 7 and 9. The outer end of the side 132 is provided with a threaded shank 152 having a nut 154 thereon. This threaded shank passes through aligned openings in the side 132 and has a plate 156 welded thereto. The plate 156 constitutes one of a pair, the other plate 158 being in slidable contact therewith and together, the plates constitute a friction lock. The plate 158 is mounted on a screw 160 which is carried by the shank 152, the axis of the screw constituting the axis of rotation of the plate 158. A resilient or yieldable pad 162, preferably of soft rubber, is fastened to the outer surface of the plate 158 and is adapted to engage one surface of the radiator 126.

At the outer end of the side 130 of the yoke 128 there is a shank 164 which is slidable through aligned openings therein and which is adapted to be manually slid. A screw 166 is fastened to the shank 164 at the inner end thereof and constitutes an axis of rotation for the plate 168 which constitutes a part of the pair of plates 168 and 170 respectively. The plate 170 is welded to the inner end of the shank 164 and cooperates with the plate 168 to form a friction holder. A pad 172 identical to the pad 162 is provided on the outer surface of the plate 168 and is adapted to engage the surface of the radiator opposite from that surface contacted by the pad 162.

When the radiator 126 is located between the pads, after the nut 154 has been adjusted to approximately the proper position, the shank 164 is pushed inwardly manually until the pad 172 contacts one surface of the radiator very firmly in order to hold it. Then, the cam 180 is rotated by its handle 182 about the spindle 184. This spindle is fastened by suitable means to the extreme outer end of the side 130 of the yoke 128. Inasmuch as the cam bears upon a pair of locking plates 186 and 188, the locking plates are operated. These plates are provided with apertures through which the shank 164 passes and they are so designed as to bite into or engage firmly the surface of the shank 164 in order to hold it against further axial movement. To assist in the proper holding action and to return the locking plates 186 and 188, a spring 190 seats against one of the plates and against a portion 192 of the mounting bracket 194. The mounting bracket is welded or otherwise rigidly fixed to the side 130 of the yoke and has an opening in it through which the shank 164 passes.

It will be noted that when the radiator 126 is held by the clamp 150, the radiator is capable of being rotated about an axis in a horizontal plane but normal to the axis of rotation of the plate 140 with respect to the plate 142.

When the radiator is so rotated the plates **168** and **158** of the two pairs of plates in the clamp **150** slide with respect to the other two plates of the two pairs of plates in the clamp **150** and are held in the new position by friction. Accordingly, the radiator **126** may be held in virtually any position for soldering by using the structure of the instant invention.

Having described the invention, what is claimed as new is:

1. For use in lifting radiators for the repair thereof, an extensible support consisting of a stationary hollow housing, a cylinder slidable from said housing, a piston in said cylinder and including a head with a piston rod extending therefrom, said piston rod having a longitudinal passage therethrough, a fluid storage tank disposed in said housing, means including an air inlet line and an air inlet valve for applying air pressure to the fluid in said storage tank, a fluid conductor extending from said tank, a fluid control valve secured to said conductor, a casing connected with said conductor downstream of said fluid control valve, said piston rod being secured to said casing and having its passage in registry with the interior thereof so that fluid in said casing may pass through said piston rod and into said slidable cylinder to push said cylinder outwardly of said stationary housing, an air exhaust valve connected with said air inlet line to vent the interior of said fluid storage tank of air under pressure and thereby permit the fluid to return through said piston rod passage, casing and fluid control valve, linkage means to simultaneously actuate one of said air valves and said fluid control valve, a structural support in said housing on which said linkage means is mounted, a guide coacting with said cylinder while it is extended from and withdrawn into said housing, and means in said hollow housing supporting said guide in contacting relation with said cylinder.

2. The extensible support of claim 1 wherein there are means at the bottom of said housing centering said casing therein so that said piston is aligned with the bore of said cylinder in which it is operable.

References Cited in the file of this patent

UNITED STATES PATENTS

842,961	Kewley	Feb. 5, 1907
1,432,725	Nolting	Oct. 17, 1922
1,495,894	Du Bois	May 27, 1924
1,732,081	Clement	Oct. 15, 1929
1,778,563	Peck	Oct. 14, 1930
1,823,204	Long	Sept. 15, 1931
2,227,161	Shelburne	Dec. 31, 1940
2,239,893	Jackman	Apr. 29, 1941
2,336,808	Simon	Dec. 14, 1943
2,402,505	Moore	June 18, 1946
2,463,966	Hauschild	Mar. 8, 1949
2,474,336	Stone	June 28, 1949
2,567,384	Lietz	Sept. 11, 1951
2,574,589	Ragin	Nov. 13, 1951
2,576,660	Williams	Nov. 27, 1951
2,602,990	Ferguson	July 15, 1952