Sept. 22, 1964 R. V. WATKINS 3,149,825

RADIATOR REPAIR DEVICE

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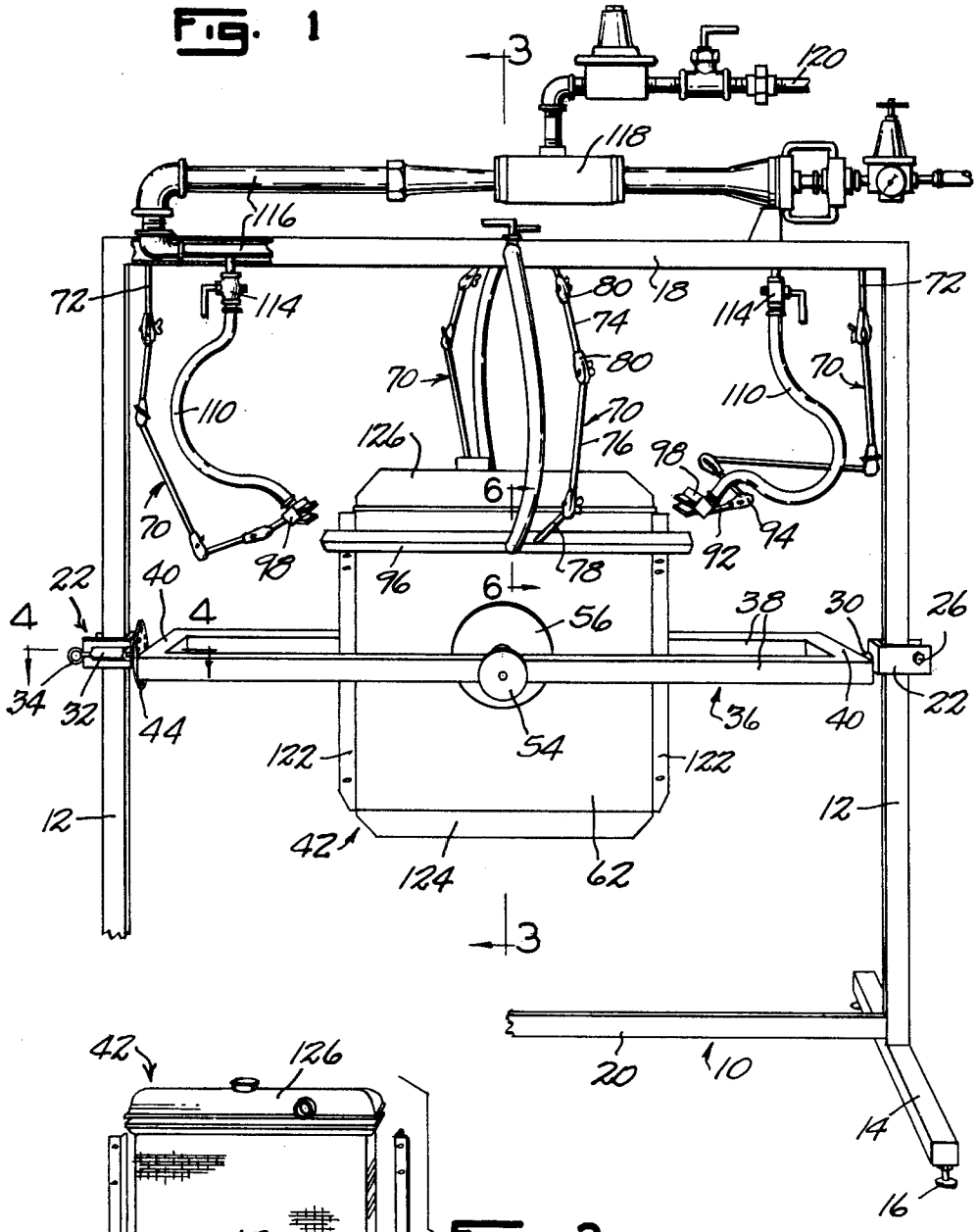
FIG. 1



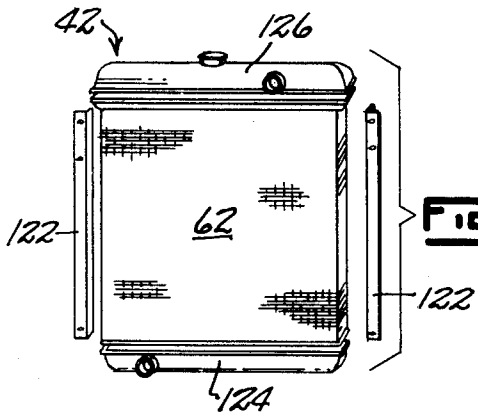


FIG. 2

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FIG. 3

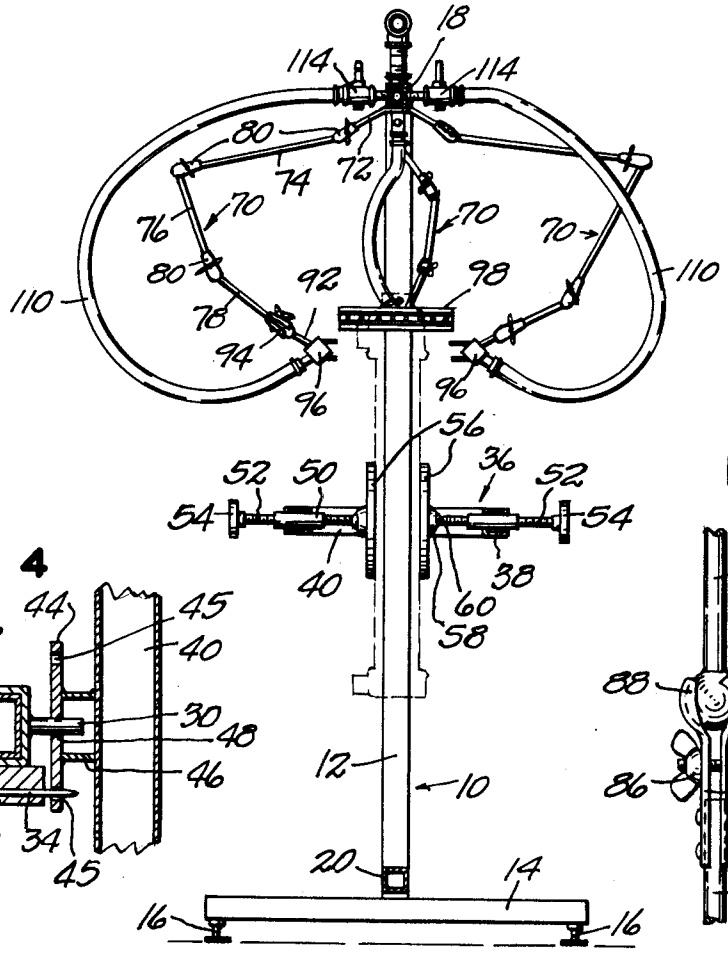


FIG. 4

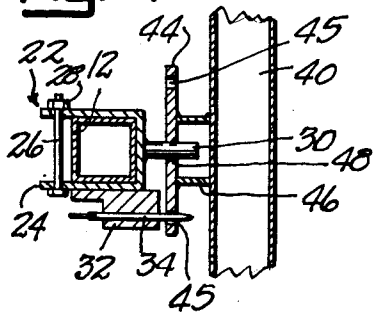


FIG. 5

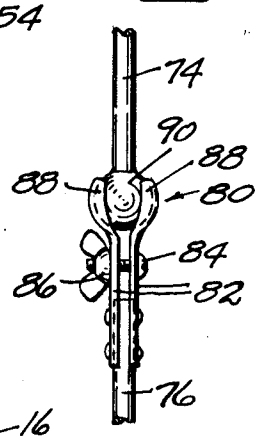
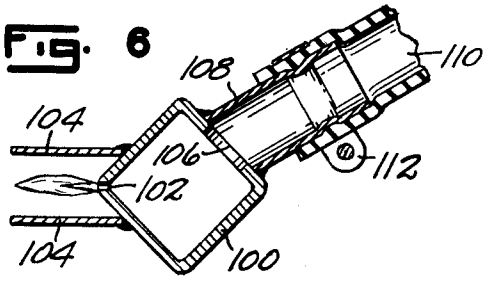


FIG. 6



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RADIATOR REPAIR DEVICE

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5 Claims. (Cl. 263—2)

This invention relates to radiator repair devices, and more particularly to a device used in the repair of automobile radiators and in the repair of heat transfer grills of refrigerators and air conditioners and other devices.

The primary object of the invention is to provide a device of this character which can be employed to mount a radiator, heat transfer unit or other work piece of any of a wide range of sizes in a convenient position for the performance of work thereon, and for holding the same in a selected tilted and rotative position.

A further object of the invention is to provide a device of this character having means for clamping a radiator in a selected convenient position and having a plurality of heater units mounted upon elongated adjustable arms in such a manner that they may be moved to any selected position relative to the radiator to direct heat at selected parts of the radiator regardless of the size and configuration of the radiator.

Other objects will be apparent from the following specification.

In the drawing:

FIG. 1 is a front perspective view illustrating one embodiment of the device having a radiator supported therein and heaters juxtaposed in operative position to such radiator;

FIG. 2 is a perspective view of the parts of a radiator illustrating their relative location;

FIG. 3 is a vertical sectional view taken on line 3—3 of FIG. 1;

FIG. 4 is an enlarged horizontal sectional view taken on line 4—4 of FIG. 1;

FIG. 5 is an enlarged detail view of a joint connecting sections of a heater mounting arm; and

FIG. 6 is an enlarged detail sectional view of a burner.

Referring to the drawings which illustrate one embodiment of the invention, the numeral 10 designates a frame having a pair of uprights 12 spaced apart a distance substantially greater than the width of the largest radiator or work piece to be mounted in the device. The uprights 12 are supported upon elongated horizontal bottom supports 14 preferably mid-length of said bottom supports. The bottom supports are provided at each end thereof with vertically adjustable foot members 16. The frame uprights 12 are rigidly connected by an upper cross member 18 and a lower cross member 20. The frame is strong and rigid and defines therein a work space larger than any radiator or work piece to be received therein. The adjustable foot members 16 permit accurate setting of the frame so that it will be supported firmly in an erect position regardless of deviations of the floor or other supporting surface from a true horizontal flat plane.

The various frame members 12, 14, 18 and 20 may be formed of metal tube stock or of any other material found suitable.

Each of the frame uprights 12 mounts adjustably thereon a clamp member. One form of such clamp member is illustrated in FIG. 3 and comprises a substantially C-shaped clamp body 22 fitting snugly but slidably upon an adjacent upright with opposed end portions 24 of the clamp arms projecting beyond the upright and receiving in apertures thereof the shank of a clamp bolt 26 having a nut 28 threaded thereon so as to apply to and release from the opposed clamp arms a clamping pressure sufficient to anchor and clamp at any selected elevation

upon the uprights 12. Each clamp has a trunnion pin 30 projecting inwardly of the frame horizontally so that it may be aligned axially with a similar trunnion pin on the opposite upright. One of the arms of each clamp 22 carries lock means, such as an apertured block or guide 32 within which is slidable a locking pin 34 substantially parallel to the trunnion pin 30 and spaced therefrom. Locking pin 34 is slidable in the guide 32 in an endwise direction for purposes to be described.

A clamp frame 36 is supported rotatably upon the trunnion pins 30. Clamp frame 36 consists of a rigid structure having two spaced longitudinal frame parts 38 and two transverse frame parts 40 welded or otherwise secured together with the parts preferably formed of metal tube stock or of any other suitable structural members. The spacing between the longitudinal frame parts 38 is sufficient to permit free insertion therebetween of a radiator 42 or other work piece to be supported thereby. At or near the center of each transverse part 40 is provided a pivot opening for a trunnion pin 30. Thus at one end of clamp frame 36 may be mounted a disk 44 spaced from the adjacent transverse frame part 40 and supported thereon by any suitable bracket or spacer parts 46 which may be welded or otherwise suitably secured to the part 40. The disk 44 has a central aperture 48 which has a rotative mount upon a trunnion pin 30. The disk 44 has a circular series of apertures 45 therein, said series being concentric with the disk aperture 48 and being spaced from the axis of the aperture 48 such a distance as to receive the lock pin 34. Thus it will be apparent that by providing a number of apertures 45 at selected locations it is possible to select the tilted or rotative position of the clamp frame 36 which is most convenient to the user and to lock the frame 36 in the selected rotative position.

Each of the longitudinal parts 38 of the clamp frame has a passage or opening therethrough substantially axially aligned with a similar aperture in the opposite longitudinal frame part, and within these apertures may be mounted and secured, as by welding, an elongated internally screw-threaded tube 50 whose axis lies in the plane of the clamp frame 36. A screw-threaded shank 52 is threaded in the tube 50. The shank 52 preferably mounts a knob 54 at its outer end. At its inner end the shank 52 mounts a pressure plate 56 or clamp plate. Clamp plate 56 is preferably mounted upon the shank 52 by a swivel fitting or universal joint, such as a socket 58, receiving a ball on the end of the screw shank 52. If desired, the clamp plate 56 may have an inner facing of rubber or other cushioning material (not shown). The parts 52, 56 constitute clamping means carried by the clamp frame parts 38 and are adapted to receive therebetween a work member such as the central core or grill portion 62 of a conventional automobile radiator or other heat exchange unit characterized by liquid flow tubes (not shown) passing through grill defining honeycomb or fin members in a manner well understood in the art. The provision of a resilient facing on the clamp plates 56 accommodates a clamping grip upon the radiator core 62 sufficiently strong to hold the radiator and at the same time permits limitation of the pressure applied so as not to deform the fins or grill. The frame 10 mounts a plurality of elongated articulated heater arms 70. These arms are preferably carried by the upper frame member 18 with two thereof being mounted upon said frame member adjacent to the center thereof and one thereof being mounted adjacent each end of the frame. Each of the arms 70 consists of a plurality of sections of rigid bar or rod stock. The uppermost section 72 of each arm is preferably secured to the frame. One or more additional sections, here identified as sections 74, 76 and 78, complete

each arm. The arm sections 72, 74, 76 and 78 are interconnected by joint members 80. Each joint preferably is of the ball and socket type having a clamp capable of locking the joint in selected position. Thus, as illustrated in FIG. 5, a pair of clamping jaws 82 are mounted fixedly upon the end of one arm section to project longitudinally therefrom and are interconnected by a clamp bolt 84 on which is threaded a nut 86 spaced from socket-defining jaw end portions 88. The other arm section to be connected has a ball 90 at its end which is received between the socket-defining jaw end parts 88 and which can be clamped in any selected attitude therein within a substantial range when the nut 86 is drawn tight on the clamp bolt 84.

Each of the heater arms 70 carries a heater at its end. Each heater preferably has an arm 92 projecting therefrom and in turn connected by a joint 94 to the outer end arm section 78. Four heaters are provided in the device as her shown, the same preferably constituting two longitudinally extending heaters 96 and two transversely extending heaters 98. The heaters may be of any type found suitable and capable of generating quickly an amount of heat necessary to melt solder. Thus the heaters may be electrical heaters, gas-burning heaters, or oil-burning heaters.

For purposes of illusrtation only, I have herein shown gas-burning heaters. Each of these heaters constitutes an elongated tube 100 closed at both ends and having a series of longitudinally spaced burner ports 102. A pair of spaced flame-directing plates 104 extend parallel to, at opposite sides of, and spaced from the series of flame ports 102. The opposite ends of each heater tube are closed and, aside from the ports 102, the only opening in the tube is an inlet or gas feed opening 106 with which communicates an inlet tube 108. An elongated flexible gas supply tube or conduit 110 is secured to the inlet tube 108 by any suitable clamp 112. At its opposite end each gas supply tube 110 is connected to a gas valve 114, which in turn communicates with a supply conduit 116 carried by frame 10 and leading to a fuel-air mixer 118 connected to a gas line 120. It will be understood that the mixer 118 will mix in selected proportions gas from line 120 and air so as to supply a combustible mixture to each of the heaters 96 and 98.

In the use of the device a work piece, such as a radiator 42, is mounted in the clamp frame 36 while that clamp frame is held in a selected position by engagement of the pin 34 in a selected opening 45 of the disk 44. The radiator is mounted in place by manipulating one or both of the clamp screws 52 while holding the radiator in the position desired for use.

Asuming that it is desired to remove the marginal frame parts 122 at the sides of a radiator, the bottom radiator tank 124 and the top radiator tank 126, the radiator is first rotated in the clamp frame to position uppermost the part of the radiator to be removed first. Thereupon the heater arms 70 are adjusted to position the various heaters 96 and 98 adjacent to that uppermost marginal radiator part, so that heat from said heater will be directed uniformly full length of said radiator part at the soldered areas thereof. Operation of the heaters will rapidly and substantially uniformly and simultaneously release the solder joints between the radiator core and said radiator marginal part full length and permit disengagement of the radiator marginal part from the radiator core. Thereupon the radiator can again be rotated to a new position and the heater is adjusted with respect to the marginal heater part then uppermost and the operation is repeated. It will thus be seen that the radiator marginal parts at all four margins of the radiator can be quickly heated to destroy the solder bonds thereof with the radiator core and facilitate removal thereof.

If the service to be performed upon the radiator is simply cleaning of the tubes thereof by passing rods therethrough, the clamp frame 36 can then be swung about

the trunnion pins 30 to any selected tilted or rotative position at which the workman can perform the work most comfortably and conveniently and the clamp frame can be locked in that position by passing the lock pin 34 through a selected aperture 45 of the disk 44.

It will be apparent that the device can be used to quickly and conveniently perform a number of services upon a radiator to perform separation and reassembly of parts. Adjustment of the position of the radiator as it is being worked upon can be provided by rotation of the radiator in its plane or by rotation of the radiator on any axis passing therethrough. Thus it is possible that the position of the work can be changed quickly to permit access to different parts thereof and the workman can perform services on all these parts while maintaining a comfortable working position or stance.

The adjustable mounting of the heaters makes possible the accommodation of radiators of a large number of types and sizes. Also, it will be apparent that the provision of end heaters 98 in addition to elongated side heaters 96 insures that heat will be directed to all parts of a radiator simultaneously to release the solder bond. It will also be apparent that the adjustment of the position of the clamp frame 36 vertically upon the main frame accommodates mounting of radiators of different sizes for convenient positioning by any given workman. The provision of flexible fuel supply conduits, together with the multiple section jointed adjustable heater mounting arms is also important from the standpoint of convenience of use and ability to move a heater out of the path of movement of the radiator as it is being adjusted to different positions as for the performance of different services thereon after the need for the heaters has ended. At the same time the jointed arms permit maintenance of a selected position for each heater during use.

While the preferred embodiment of the invention has been illustrated and described, it will be understood that changes in the construction may be made within the scope of the appended claims without departing from the spirit of the invention.

I claim:

1. A work heating device comprising
an upright frame having an upper central part and having opposite sides and two ends,
a clamp frame rotatably mounted on said upright frame,
clamp means carried by said clamp frame and including rotatable members accommodating rotation of a radiator supported by said clamp means,
a plurality of heaters, and
heater supporting means including a plurality of elongated arms connected by articulating means, two of said heater support means being carried by the upper central part of said upright frame and mounting elongated heaters adjacent opposite sides of said frame, and other heater support means being carried by the upper part of said upright frame adjacent each end thereof and mounting a heater adjacent an end of said frame.

2. A work-heating device comprising
an upright frame having spaced upright members connected by vertically spaced transverse members,
a clamp frame rotatably mounted in said upright frame and including spaced opposed elongated interconnected parts,
adjustable opposed clamp members carried by said elongated clamp frame parts and each including work-engaging part rotatable on an axis substantially aligned with the pivot axis of the opposed part and perpendicular to the axis of rotation of said clamp frame,
a plurality of heaters, and
elongated articulated multiple-section arms carried by said upright frame and each supporting a heater in

selected relation to a work piece carried by said clamp members.

3. A work-heating device comprising

a supporting frame having opposed uprights,

a clamp frame rotatably mounted on said supporting frame uprights on a substantially horizontal axis,

releasable means for locking said clamp frame in selected rotative position,

work clamp means carried by said clamp frame and rotatable on an axis transverse of said clamp frame rotative axis,

a plurality of heaters, and

elongated heater supporting arms carried by said supporting frame above the pivot axis of said clamp frame,

said arms each comprising a plurality of sections connected endwise by articulating joints.

4. A working-heating device comprising

a supporting frame having opposed uprights,

a clamp frame rotatably mounted on said supporting frame uprights on a substantially horizontal axis,

releasable means for locking said clamp frame in selected rotative position,

work clamp means carried by said clamp frame and rotatable on an axis transverse of said clamp frame rotative axis,

a plurality of heaters, and

elongated heater supporting arms carried by said supporting frame above the pivot axis of said clamp frame,

each arm constituting a plurality of elongated sections and universal joints connecting said sections,

each joint including a plurality of interfitting parts and

clamp means for holding said parts in selected position.

5. A work-heating device comprising

a supporting frame having opposed uprights,

a clamp frame rotatably mounted on said supporting frame uprights on a substantially horizontal axis,

releasable means for locking said clamp frame in selected rotative position,

work clamp means carried by said clamp frame and rotatable on an axis transverse of said clamp frame rotative axis,

a plurality of heaters, and

elongated heater supporting means carried by said supporting frame above the pivot axis of said clamp frame,

each arm constituting a plurality of elongated sections connecting end to end by ball and socket joint means,

said ball and socket joint means including releasable clamp means for holding adjacent arm sections in selected angular relation.

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