

March 24, 1942.

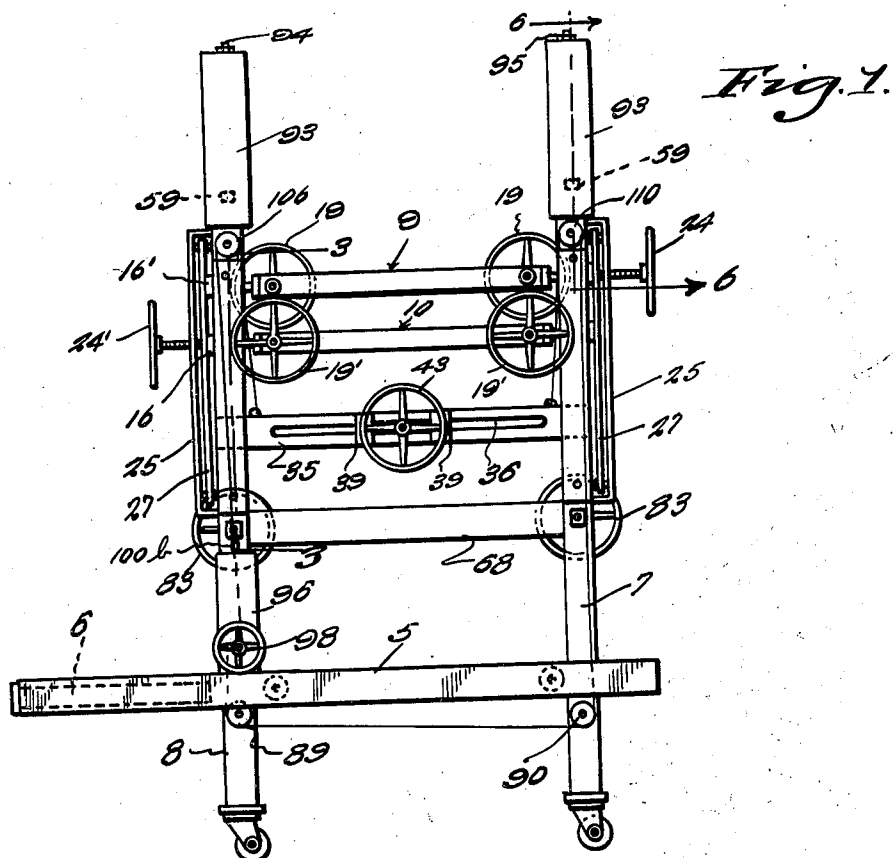
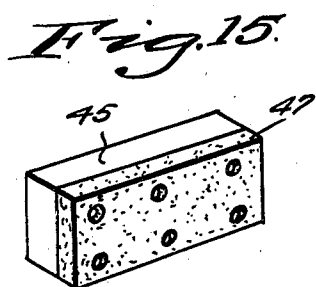
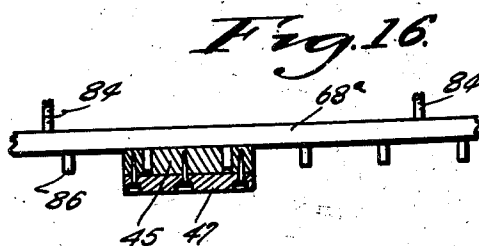
W. L. HARRISON

2,277,489

RADIATOR BENDING MACHINE

Filed May 24, 1939

5 Sheets-Sheet 1



Inventor

William L. Harrison

By *Clarence A. O'Brien*
and Hyman Berman
Attorneys

March 24, 1942.

W. L. HARRISON

2,277,489

RADIATOR BENDING MACHINE

Filed May 24, 1939

5 Sheets-Sheet 2

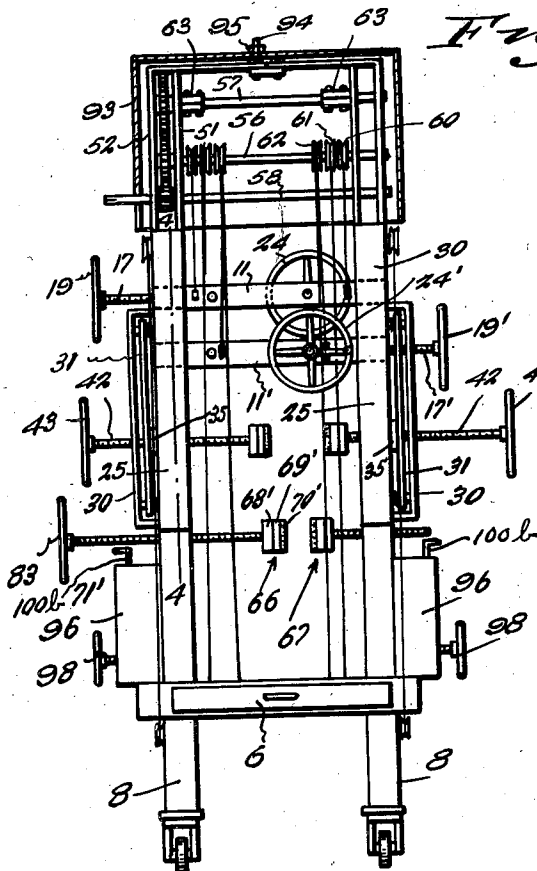


Fig. 2.

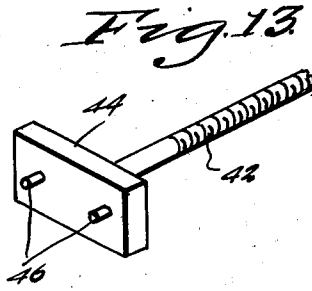


Fig. 13.

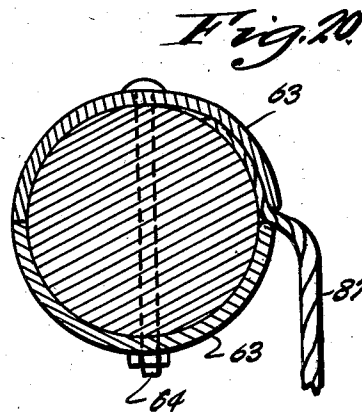


Fig. 20.

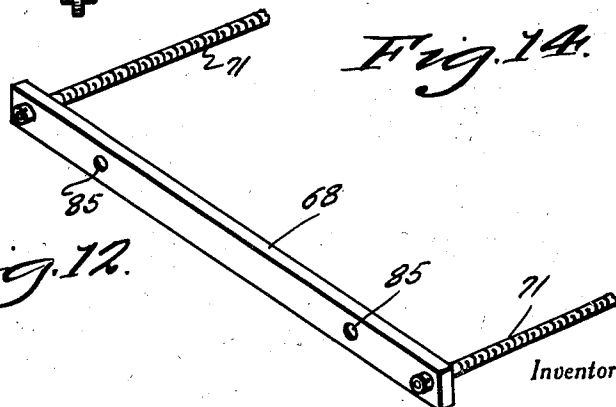


Fig. 14.

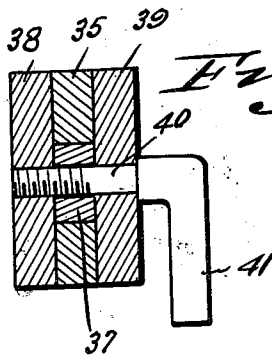


Fig. 12.

Inventor
William L. Harrison

By *Oliver A. O'Brien*
and *Hyman Berman*
Attorneys

March 24, 1942.

W. L. HARRISON

2,277,489

RADIATOR BENDING MACHINE

Filed May 24, 1939

5 Sheets-Sheet 3

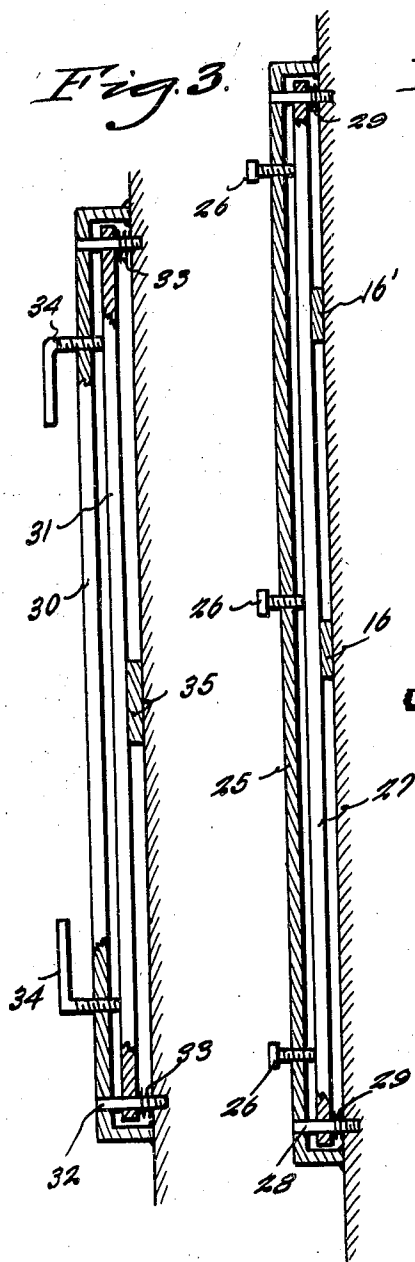


Fig. 4.

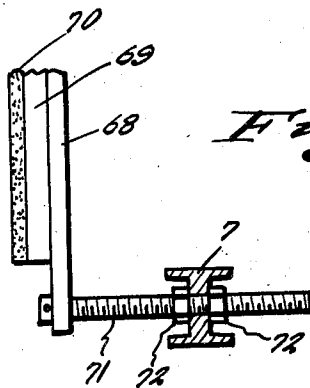


Fig. 19.

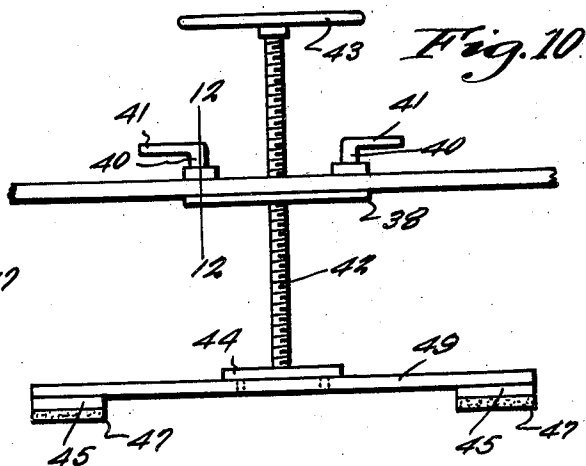
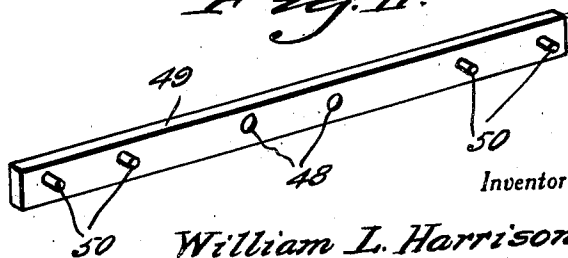


Fig. 10.

Fig. 11.



Inventor

William L. Harrison

By *Oliver A. O'Brien*
and *Hyman Berman*
Attorneys

March 24, 1942.

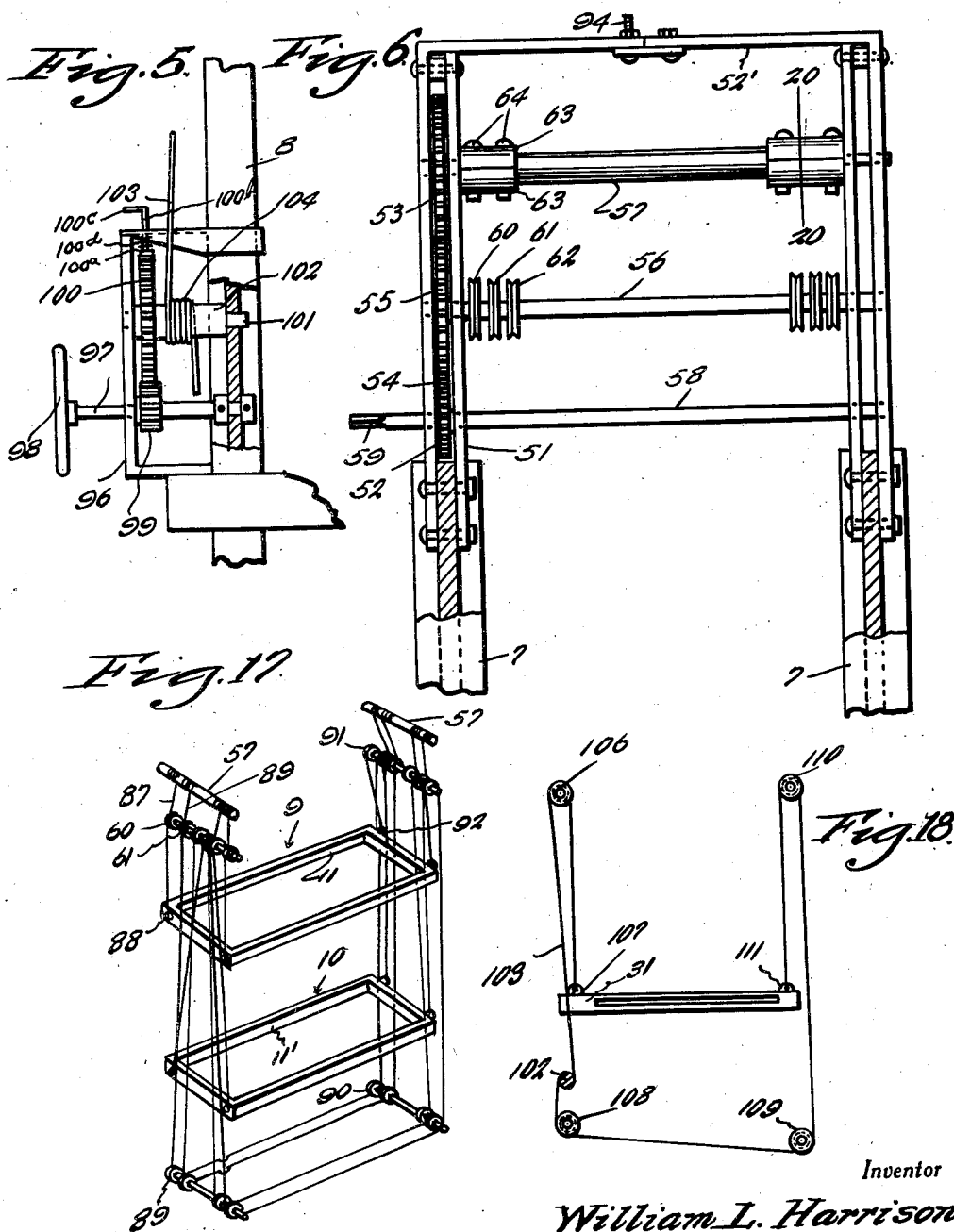
W. L. HARRISON

2,277,489

RADIATOR BENDING MACHINE

Filed May 24, 1939

5 Sheets-Sheet 4



Inventor

William L. Harrison

By

Oliver A. O'Brien
and Hyman Berman
Attorneys

March 24, 1942.

W. L. HARRISON
RADIATOR BENDING MACHINE

2,277,489

Filed May 24, 1939

5 Sheets-Sheet 5

Fig. 7.

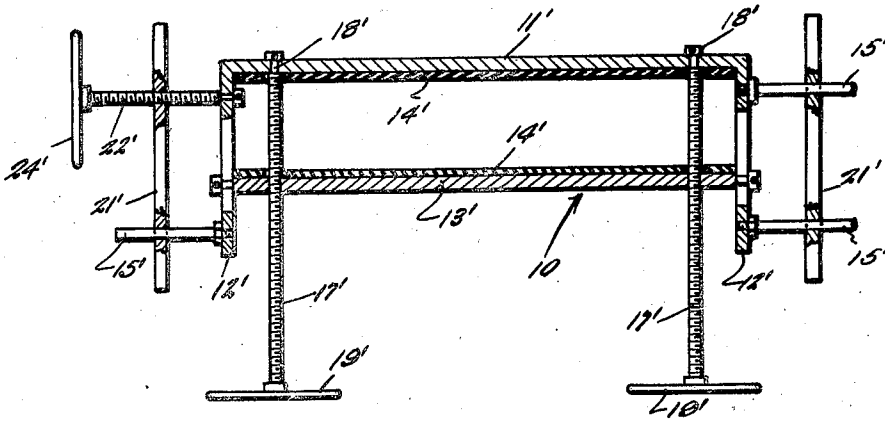


Fig. 8.

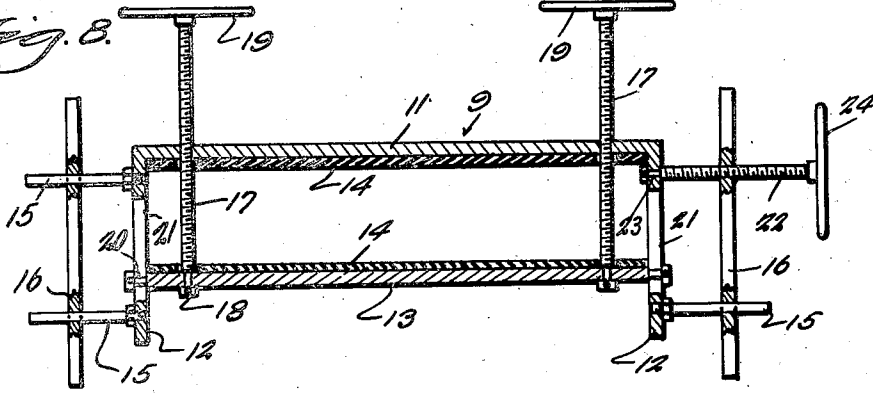
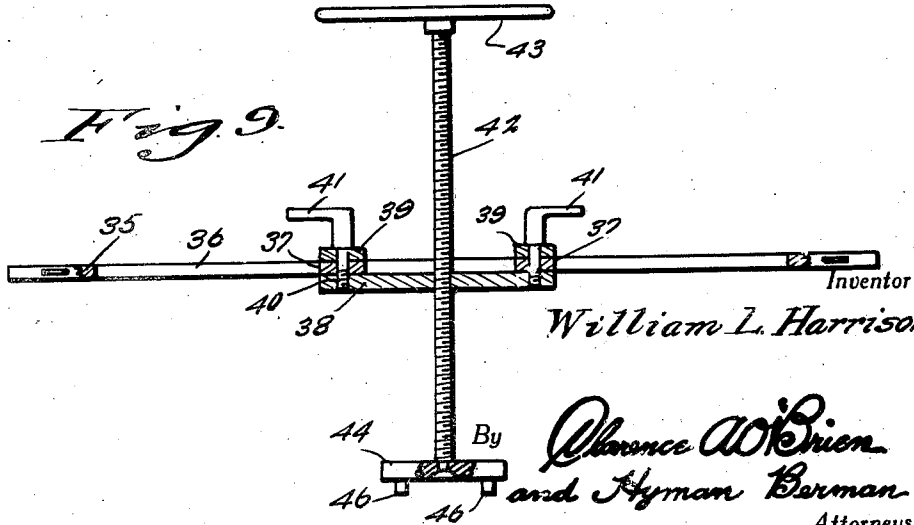


Fig. 9.



Inventor
William L. Harrison

By *Clarence A. O'Brien*
and Hyman Berman
Attorneys

UNITED STATES PATENT OFFICE

2,277,489

RADIATOR BENDING MACHINE

William L. Harrison, Lottsburg, Va.

Application May 24, 1939, Serial No. 275,557

5 Claims. (Cl. 153—48)

This invention relates to new and useful improvements in bending machines and more particularly to a radiator bending or reshaping machine.

The principal object of the present invention is to provide a machine for bending damaged radiators in a quick, accurate and practical manner.

Still another important object of the invention is to provide a radiator bending or reshaping machine which will allow for a considerable number of adjustments whereby minute straightening or reforming steps can be executed.

These and various other important objects and advantages of the invention will become apparent to the reader of the following specification.

In the drawings:

Figure 1 represents a side elevational view.

Figure 2 is a front end elevational view.

Figure 3 is a vertical sectional view on a line 3—3 of Figure 1.

Figure 4 is a vertical sectional view taken substantially on a line 4—4 of Figure 2.

Figure 5 is a fragmentary detailed sectional view through one of the adjusting winches.

Figure 6 is a fragmentary enlarged vertical sectional view on a line 6—6 of Figure 1.

Figure 7 is a horizontal sectional view through the lower clamp.

Figure 8 is a horizontal sectional view through the upper clamp.

Figure 9 is a horizontal sectional view through one of the travelling reshapers.

Figure 10 is a fragmentary top plan view of the travelling reshaper shown in Figure 9 with an attachment thereto.

Figure 11 is a perspective view of the attachment shown in Figure 10.

Figure 12 is a sectional view on the line 12—12 of Figure 10.

Figure 13 is a fragmentary perspective view of the pressure block of the structure shown in Figure 9.

Figure 14 is a fragmentary perspective view.

Figure 15 is a perspective view of a form of pressure block.

Figure 16 is a fragmentary top plan view of the form of pressure block shown in Figure 15 used in conjunction with a modified form of carrier bar.

Figure 17 is a diagrammatic view disclosing the cable arrangement for lifting and lowering the different parts.

Figure 18 is a side elevational view diagrammatically showing the means for lifting one of the slide type reshapers such as shown in Figure 9,

Figure 19 is a fragmentary top plan view showing the lowermost stationary clamp.

Figure 20 is a section on the line 20—20 of Figure 6.

Referring to the drawings wherein like numerals designate like parts, it can be seen that the numeral 5 represents a platform having a drawer 6 in one end thereof. The frame consists of the vertically extending I-beams 7—7 at one end and 8—8 at the opposite end, and these beams are suitably secured to the platform 5.

Adjacent the upper portion of the frame are the vertically adjustable units generally referred to by numerals 9 and 10.

The upper unit consists of the U-shaped horizontally disposed frame 11 which includes the leg portions 12—12 between which extends and is slidably movable the bar 13. The back wall of the U-shaped member 11 and the bar 13 have their opposed faces covered with rubber or cushion strips 14, so as to not unnecessarily mar the radiator being reformed.

Extending from the leg portions 12 are the pins 15, there being two pins projecting from each leg portion and these pins are slidably disposed through a corresponding cross bar 16 at each end of the unit.

Screw shafts 17 are threadedly disposed through the back portion of the frame 11 and swivelly disposed as at 18 through the bar 13. The outer end of each of these screw shafts 17 has a hand wheel 19. Extending longitudinally from the ends of the bar 13 are the reduced extensions 20 which are disposed through the slots 21 in the legs 12. Obviously, by rotating the hand wheels 19 the bar 13 can be drawn inwardly or outwardly with respect to the back wall of the frame 11.

To move the unit longitudinally of the frame of the machine, a screw shaft 22 is provided at one end of the unit and threadedly disposed through the corresponding bar 16 and this has its inner end split swivelled to the adjacent leg 12 as at 23.

The unit generally referred to by numeral 10 is constructed in substantially the same manner as the unit 9, and reference can be had to the unit 10 by understanding that all of the numerals relative to the unit 9 and corresponding to like parts in unit 10 have primed. It will also be observed that the unit 10 is oppositely disposed in the frame of the machine with respect to the unit 9 with the hand wheels 19' on the opposite side of the machine from the hand wheels 19 and the hand wheel 24 on the screw shaft 22' at the

opposite end of the machine from the hand wheel 24 of the unit 9.

Guide rails 25 vertically extending on the posts 7 and 8 receive the bars 16 and 16'. As shown in Figure 3, set screws 26 can be driven through the guide rail and against a bar 27 which is slidably disposed on the guide pin 28 at the upper and lower ends thereof to effect the desired pressure against the bars 16 and 16'.

On the side of the I-beams 7 and 8 are the vertical guide rails 30 in each of which is a pressure bar 31 having its end portions slidably disposed on the guide members 32 against the tension of compression springs 33 on the said guide members 32 and this bar 31 can be urged to the desired extent by the handle equipped screws 34 against the end portion of the corresponding side bar 35. There is one of these side bars 35 at each side of the machine and each has a longitudinally extending slot 36 therein in which the riders 37—37 are disposed. A plate 38 is slidably disposed against the inside of the bar 35 while cross members 39—39 are provided at the outside of the frame over the riders 37. Screw members 40 are disposed through the cross bars 39, riders 37 and into the end portions of the plate 38, as shown in Figure 9. These screws 40 have handles 41 which can be rotated to tighten the parts above stated to fix the plate 38 at the proper adjusted position along the corresponding bar 35.

Feedable through the slide plate 38 is the screw shaft 42 having the hand wheel 43 at its outer end and a force applying the foot 44 at its inner end. The foot 44 can have a block 45 disposed thereon, the block having a pair of recesses for the stud 45 and the resilient spacing bead 47, or on the other hand the foot 44 can have its stud engaged into the opening 48 at the intermediate portion of the elongated bar 49 and at the end portions of this bar 49 are the studs 50, thus permitting a pair of the blocks shown in Figure 15 to be carried.

As shown in Figure 6, from the upper portion of each I-beam 7 and 8 extends a pair of bars 51—52, the bars 52 being longer than the bars 51 and having their upper ends bent over the machine to a bridging position. (See Figure 6.) Between one pair of the bars 51 and 52 are disposed the gear 53, the gear 54 and the idler 55. The idler 55 is on the shaft 56 while the gear 53 is on the shaft 57. The gear 54 is on the shaft 58 and has a squared end 59 over which can be disposed a crank or hand wheel.

On each end portion of each of the shafts 56 are three pulleys, 60, 61 and 62. As shown in Figures 6 and 20, to secure the upper ends of the cables, illustrated in Figure 17, a pair of semi-cylindrical clamp members 63—63 are positioned on each end of each of the shafts 57 and bolts 64 are disposed through these semi-cylindrical members and the shaft 57 so that one of the members can be clamped against the adjacent terminal of the cables. (See Figure 20.)

Below the travelling reshaper supporting bars 31 are the clamp units generally referred to by numerals 66 and 67 (see Figure 2).

The unit 67 consists of a bar 68 (see Figure 19) which has the plank 69 secured at one side thereof and provided with a resilient facing 70.

Screws 71 are swivelly disposed through the ends of the bar 68 and these screws 71 are disposed through the corresponding corner posts 7 or 8 and equipped with jamb nuts 72 at opposite sides of the post so that the screw is positively set

and is not adapted for ready adjustment as is the clamp member 66.

The clamp member 66 also consists of a bar 68' having the plank 69' with the resilient facing 70', but the screws 71' are provided with hand wheels 83 as shown in Figure 2.

A modification of the form of clamp means is shown in Figure 16 wherein an attachment is employed in conjunction with the bar 68 and this consists of the bar 68a having the threaded members 84 extending therefrom for disposition through the openings 85 in the bar 68 or 68'. This bar 68a has a plurality of pins or studs 86 projecting therefrom and over which can be disposed one or more of the blocks 45 (see Figure 15). This is for the purpose of getting pressure at several points at this particular level on the radiator.

As can be seen in Figure 17, the cable arrangement is adaptable for elevating or lowering the upper units 9 and 10. This consists in, for instance, disposing a cable 87 downwardly from one shaft 57 over a pulley 60 to connect to the frame 11 as at 88, a second cable 89 disposed downwardly from the shaft 57 to pass over a pulley 61 and to extend downwardly under a pulley 89 to a pulley 90 and from there upwardly at the other end of the machine to pass over a pulley 91 and attach to the frame 11 as at 92.

Additional cables extend downwardly from the shaft 57 to connect to the frame 11', and others to extend downwardly under the lower pulleys 89 and 90 to pass upwardly and connect to the ends of the frames at the opposite ends of the machine.

Thus it can be seen that by rotating the shaft 57 the frames of the units 9 and 10 can be adjusted to the desired elevation and inclination.

As can be seen in Figure 1, the hoods 93 are disposable over the upper portions of the end frames and a bolt 94 extending upwardly from the connective portions 52' of the bars 52 extends through the corresponding hood 92 and can take a nut 95 to prevent displacement of the hood. The hood is slotted to accommodate the corresponding squared shaft end 59.

As shown in Figures 5 and 18, means for controlling each of the bars 31 consists of a box 96 into which extends the shaft 97 having the hand wheel 98 at its outer end. In the box is the pinion 99 on the shaft 97 meshing with the gear 100 on the shaft 101 on which is the drum 102 which has an intermediate portion of the cable 103 wound thereon as at 104. The cable 103 extends upwardly over a pulley 106 and then downwardly to attach to the corresponding bar 31 as at 107. The cable extends in the other direction downwardly from the drum 102 under a pulley 108 and then under the platform 5 to the pulley 109 from where it extends upwardly and over the pulley 110 to extend downwardly and connect to the bar 31 as at 111.

Obviously, by rotating the drum 102 (see Figure 5) in one direction, the bar 31 will be elevated and in the opposite direction the bar will be lowered. There is one of these controls at each side of the machine for the corresponding bar 31.

To hold the drums 102 the corresponding gears 100 are equipped with pawls 100a, each having a stem 100b extending through the top of the corresponding case. A handle 100c is provided at the upper end of each stem 100b, and a compression spring 100d between each pawl and the corresponding case top serves to hold the pawl engaged with the corresponding gear 100.

In the operation of the machine it can be seen that the radiator is clamped in position between the clamp units 66 and 67, with the upper portion of the radiator extending upwardly through the units 9 and 10 (see Fig. 7). Obviously, the units 9 and 10 can be operated to bring the radiator to a proper position and in instances where this maneuver is insufficient to actually consummate the reshaping operation, additional force can be applied by means of the structures, one of which is clearly shown in Figure 9. Obviously the units operated by the hand wheels 43 can be shifted horizontally on the bars 35 to reach malformations in a transverse direction, and these units can also be actuated vertically by the cables 103 controllable by the hand wheel 98. This hand wheel operates the cable drum 102 as illustrated clearly in Fig. 5.

While the foregoing specification sets forth the invention in specific terms, it is to be understood that numerous changes in the shape, size and materials may be resorted to without departing from the spirit and scope of the invention as claimed hereinafter.

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

1. A radiator re-shaping apparatus comprising a stationary frame, a pair of radiator holding units vertically movable in the stationary frame, each provided with a U-shaped horizontally disposed member and a clamp bar movably disposed therein; means on each of the units for feeding the clamp bar against a radiator disposed through the U-shaped frame, and adjusting means for each of the units constructed and arranged to shift the U-shaped frame horizontally.

2. A radiator re-shaping apparatus comprising a stationary frame, a pair of radiator holding units vertically movable in the stationary frame, each provided with a U-shaped horizontally disposed member and a clamp bar movably disposed therein; means on each of the units for feeding the clamp bar against a radiator disposed through the U-shaped frame, and adjusting means for each of the units constructed and arranged to shift the U-shaped frame horizontally, and means attached to the ends of the units and operable to lift or lower the ends of each U-shaped frame together or independently.

3. A radiator re-shaping apparatus comprising a stationary frame, a pair of radiator holding units vertically movable in the stationary frame, each provided with a U-shaped horizontally dis-

posed member and a clamp bar movably disposed therein; means on each of the units for feeding the clamp bar against a radiator disposed through the U-shaped frame, and adjusting means for each of the units constructed and arranged to shift the U-shaped frame horizontally, said stationary frame including channeled corner posts, said adjusting means each comprising a bar having a threaded opening therein, a screw shaft disposed through the opening, a hand member on the screw shaft for rotating the shaft, a swivel connecting the shaft and the adjacent portion of the corresponding unit, the ends of the bar being slidable in adjacent channeled posts.

4. A radiator re-shaping apparatus comprising a stationary frame, a pair of radiator holding units vertically movable in the stationary frame, each provided with a U-shaped horizontally disposed member and a clamp bar movably disposed therein; means on each of the units for feeding the clamp bar against a radiator disposed through the U-shaped frame, and adjusting means for each of the units constructed and arranged to shift the U-shaped frame horizontally, said stationary frame including channeled corner posts, said adjusting means each comprising a bar having a threaded opening therein, a screw shaft disposed through the opening, a hand member on the screw shaft for rotating the shaft, a swivel connecting the shaft and the adjacent portion of the corresponding unit, the ends of the bar being slidable in adjacent channeled posts, and means attached to the bars and operable to lift or lower the ends of each U-shaped frame together or independently.

5. A radiator re-shaping apparatus comprising a stationary frame, a pair of radiator holding units vertically movable in the stationary frame, each provided with a U-shaped horizontally disposed member and a clamp bar movably disposed therein; means on each of the units for feeding the clamp bar against a radiator disposed through the U-shaped frame, and adjusting means for each of the units constructed and arranged to shift the U-shaped frame horizontally, and vertically and horizontally adjustable force applying members mounted on opposite sides of the stationary frame and means for moving the said force applying members inwardly and against desired portions of a radiator held by the said movable radiator holding units.

WILLIAM L. HARRISON.