Jan. 21, 1941. H. S. MUNCH ET AL 2,229,184

APPARATUS FOR DIPPING RADIATOR CORES

Original Filed Sept. 16, 1936 4 Sheets-Sheet 1

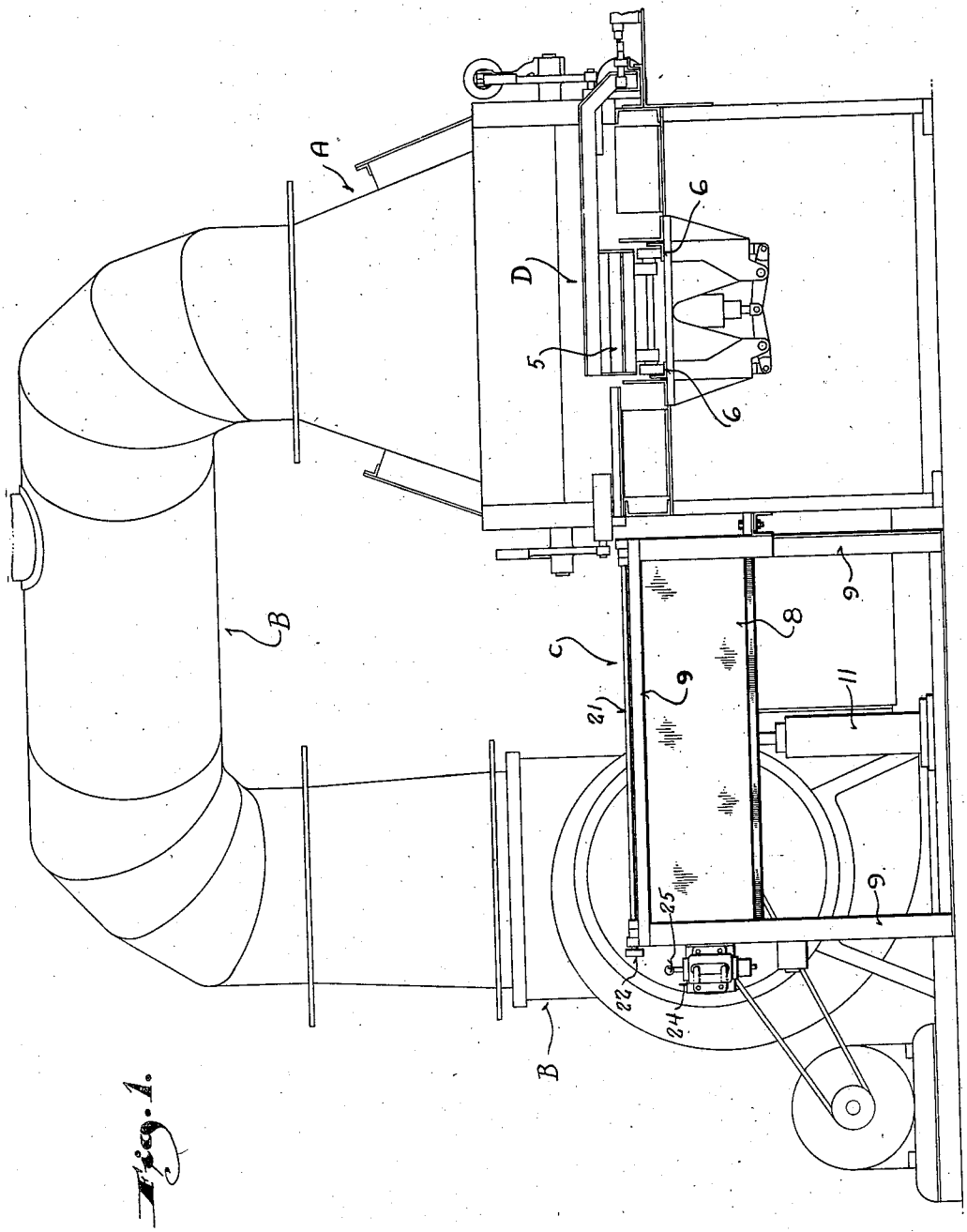


Fig. 1.

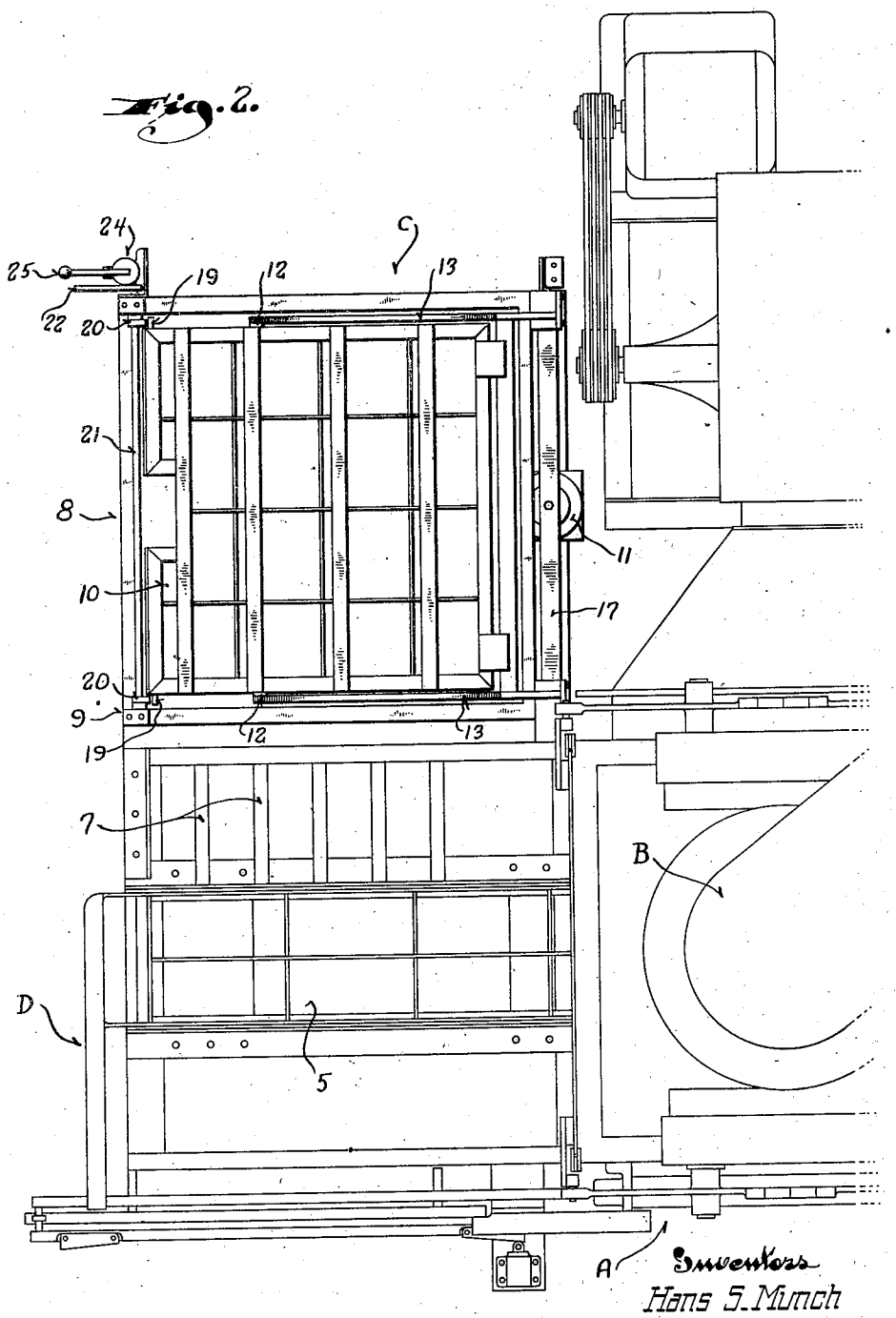
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Fig. 2.



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Fig. 3.

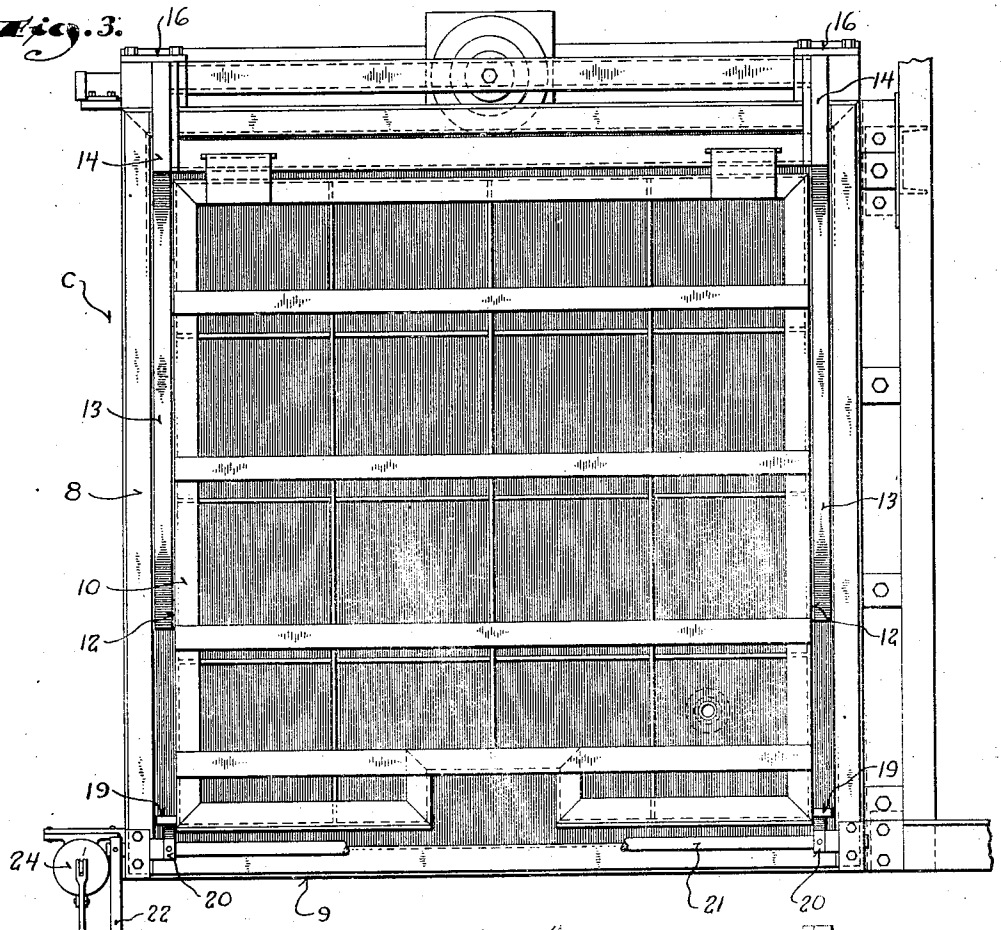
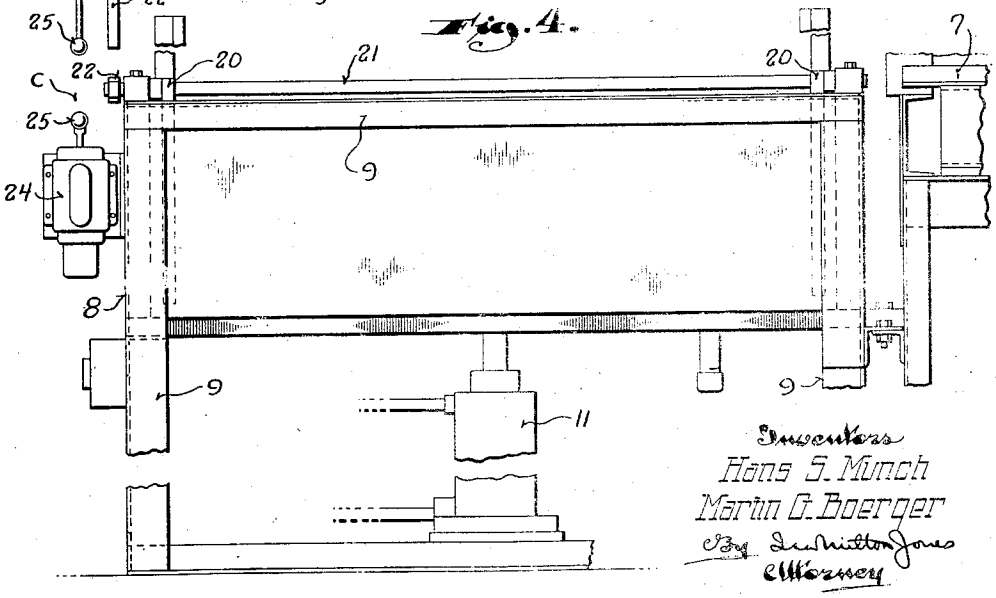


Fig. 4.



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Fig. 5.

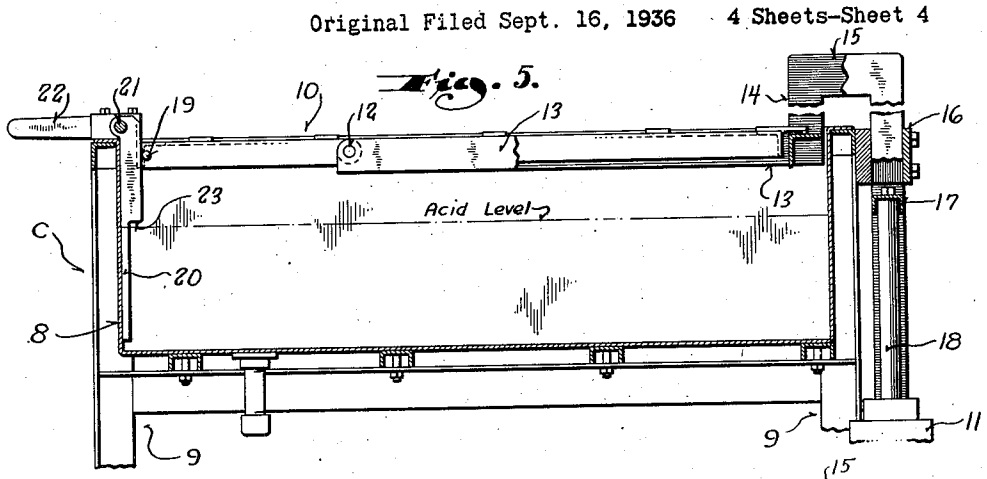


Fig. 6.

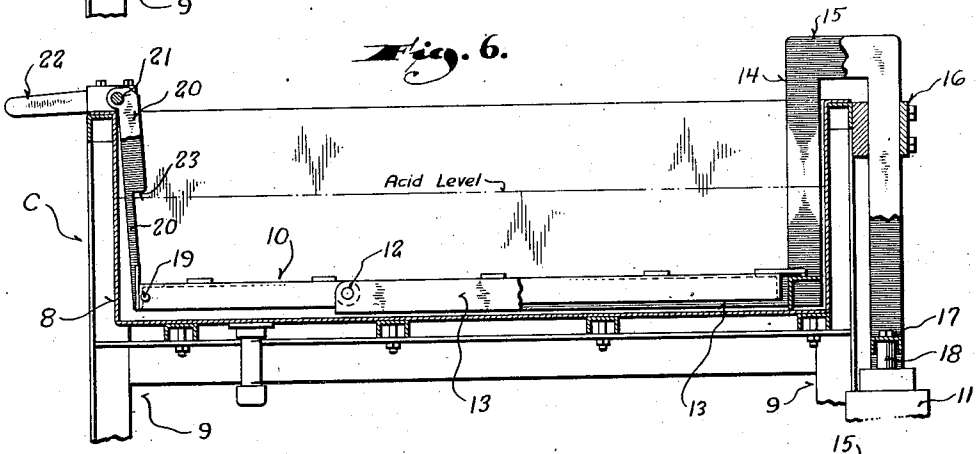
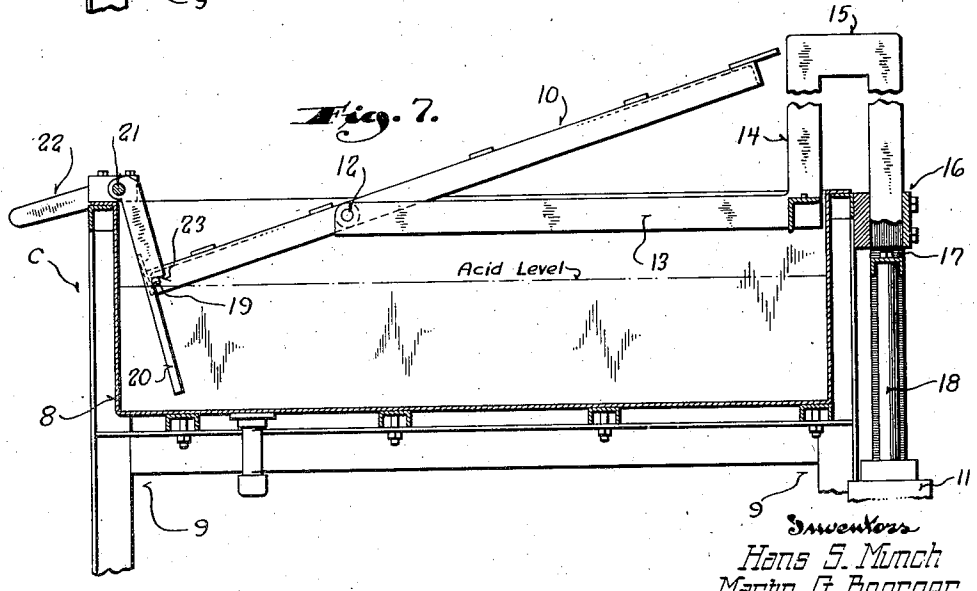


Fig. 7.



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UNITED STATES PATENT OFFICE

2,229,184

APPARATUS FOR DIPPING RADIATOR CORES

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Original application September 16, 1936, Serial No. 101,102. Divided and this application July 20, 1938, Serial No. 220,292

9 Claims. (Cl. 266—7)

This invention relates to the manufacture of radiator cores and similar articles which consist of a multiplicity of thin-walled metal tubes having a multiplicity of spaced thin metal fins attached thereto, and refers particularly to apparatus for treating the radiator cores preparatory to soldering the fins to the tubes.

In the manufacture of radiator cores, as more at length defined in the copending application, Serial No. 101,102, filed September 16, 1936, now Patent No. 2,154,104, of which this is a division, prior to the assembly of the tubes and fins, the tubes are thoroughly tinned with solder. The fins have apertures to snugly receive the tubes so that the peripheral edges of the apertures lie in close contact with the outer walls of the tubes.

The securement between the fins to the tubes is effected by first dipping the core into an acid bath to provide the flux which enables solder to adhere to the untinned fins, and then the entire core is subjected to a heat treatment at a sufficiently high temperature to melt the solder on the tubes and cause it to run onto the adjacent portions of the fins.

This invention, being directed to the treatment of the cores prior to the baking operation, has as one of its objects to provide a convenient power driven means for dipping the core into an acid bath and positioning it for ready application to a conveyor by which it is carried into the oven.

Another object of this invention is to provide an acid bath of improved construction by which the core is immersed in the bath and then shaken to remove excess acid therefrom.

A further object of this invention is to provide a simple, easily operated mechanism for dipping a core into an acid bath and elevating it out of the bath by power driven means, and in which automatically operable latch means serve to tilt the carrier for the core as the core is lifted out of the bath to facilitate draining excess acid therefrom.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described, and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate one complete example of the physical embodiment of the invention constructed in accordance with the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a front view of the entire core baking apparatus illustrating the relationship of the acid bath to the oven;

Figure 2 is a top plan view of the acid bath and the adjacent portions of the apparatus;

Figure 3 is an enlarged top plan view of the acid bath per se;

Figure 4 is a front view thereof;

Figure 5 is a cross sectional view taken through Figure 3 on the plane of the line 5—5; and

Figures 6 and 7 are sectional views similar to Figure 5, but showing the parts in different positions.

Before specifically describing the invention in conjunction with the drawings, it is desired to note that the complete core baking apparatus disclosed in the aforesaid patent comprises an oven of the convector type supplied with heated air from a heat source and heat recirculating system, an acid bath for preparing the cores for the heat treatment, a loading station arranged to receive the cores from the acid bath and present them for entrance into the oven, and a straightening or squaring unit to receive and act on the cores directly after they emerge from the oven.

The manner in which all of these various parts of the complete apparatus are coordinated is defined at length in the aforesaid parent patent, and as the present invention is concerned solely with the construction of the acid bath, only it and its immediately associated elements have been shown.

The drawings, therefore, show the oven designated by the character A, the heat source and recirculating system B, the acid bath C, and the loading station D. No part of the squaring unit is illustrated.

The oven, as stated, is of the convector type and has inlet and outlet openings in its front and rear walls, respectively, to permit the cores to be moved into and removed from the oven. To carry the cores into and out of the oven, a movable carriage 5 runs on tracks 6. This carriage, as best shown in Figure 2, is positionable at the loading station D to receive cores slid across the platform 7 of the loading station from the acid bath. The acid bath is thus mounted directly adjacent to the loading platform, as clearly shown, so that a radiator core after it has been dipped and excess acid removed there-

from, may be very conveniently slid across the loading platform onto the carriage 5 to be conveyed into the oven chamber.

The acid bath per se comprises a tank 8 large enough to receive the largest size radiator core for which the apparatus is designed. The tank is supported above the floor by a suitable fabricated frame structure 9, including legs at the four corners of the tank.

The dipping frame, indicated generally by the numeral 10, serves as a carrier for the cores which are deposited flatwise thereon. This frame is mounted to descend from a normal substantially horizontal position in alignment with the top of the tank, as shown in Figure 5, to the bottom of the tank, as shown in Figure 6. The descent and elevation of the carrier frame is effected by means of a hydraulic cylinder 11.

The dipping or carrier frame 10 is pivotally mounted, as at 12, from the side arms 13 of a U-shaped carrier 14. The side arms 13 lie just inside the side walls of the tank. At the rear corners of the U-shaped frame 14 are two yokes 15 arranged to straddle the rear wall of the tank. These yokes have a height sufficient to enable the complete descent of the carrier frame, as shown in Figure 6.

The rear legs of the yokes are slidable in guideways 16 fastened to the rear wall of the tank, and the lowermost ends of their rear legs are connected by a crossmember 17 to which the piston rod 18 of the hydraulic cylinder 11 is secured. Hence, as the piston or ram of the cylinder 11 reciprocates, the U-shaped frame 14, and consequently the dipping frame 10, is raised and lowered.

During descent of the frame to dip a core, the frame remains in its normal horizontal position, but when it is being lifted to carry the core out of the acid bath, it is automatically tilted to facilitate draining the excess acid therefrom.

For this purpose, the forward end of the dipping frame has two sidewise extending lugs 19 which at all times engage stepped stop members 20. The upper ends of these stop members are fixed to a cross shaft 21 which is journalled in suitable bearings carried by the tank. Also fixed to the shaft 21 is a weighted lever 22 which constantly tends to turn the shaft 21 in a direction to yieldingly urge the stop members 20 against the lugs 19.

At a point substantially in line with the normal acid level, the stop members have abrupt steps or shoulders 23 so that as the dipping frame rises and its lugs 19 engage these steps, continued rising of the carrier 14 causes the dipping frame 10 to tilt about its pivotal mounting 12 to an inclined position, illustrated in Figure 7. The frame remains in an inclined position until the lever 22 is lifted to disengage the steps 23 from the lugs 19, whereupon the dipping frame drops back to its normal horizontal position.

Inasmuch as the frame is substantially overbalanced to the rear, its return to normal horizontal position upon disengagement of the steps 23 from the lugs 19 is accompanied with a considerable jar which shakes off the excess acid.

Conveniently located alongside the lever 22 is a hydraulic valve unit 24 having a manual control lever 25. Through the valve 24, operable manually by its lever or handle 25, the functioning of the hydraulic cylinder 11 which operates the dipping frame is controlled.

The specific manner in which this hand controlled valve governs the functioning of the hydraulic cylinder forms no part of this invention, and for a disclosure thereof, reference may be had to the aforesaid Patent No. 2,154,104.

From the foregoing description taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art that this invention provides a novel apparatus for dipping radiator cores and the like into an acid bath, and that its automatic tilting and shaking of the cores to knock off excess acid greatly facilitates the handling of the cores and speeds up production.

What we claim as our invention is:

1. In an apparatus of the character described: a tank containing a liquid; dipping mechanism movable vertically to dip articles resting thereon into the liquid and lift them out of the liquid; and releasable latch means automatically operable upon elevation of the dipping mechanism a predetermined height to tilt the article to facilitate draining liquid therefrom, said mechanism being so balanced that upon release of the latch means the article drops with a jar to a normal horizontal position to shake off excess liquid.

2. In an apparatus of the character described: a tank containing a liquid; mechanism to dip articles into the liquid and lift them from the liquid, including a pivoted frame upon which the articles rest, said frame being so balanced with respect to the dipping mechanism as to normally maintain a horizontal position; and releasable means automatically operable upon elevation of the dipping mechanism for tilting said frame to a position from which said frame drops abruptly upon release of said means back to its normal horizontal position above the liquid to jar the article thereon and thus remove excess liquid therefrom.

3. In an apparatus of the character described: a tank containing a liquid; a dipping mechanism for dipping articles into the liquid and lifting them therefrom, including a carrier movable in a defined vertical path; a supporting frame upon which the articles rest pivotally mounted from the carrier and balanced so as to normally assume a horizontal position; and releasable latch means automatically operable upon said pivoted frame to tilt the same out of its normal horizontal position as it is elevated above the liquid, from which tilted position the frame drops by gravity upon release of the latch means to jar the article thereon and thereby remove excess liquid therefrom.

4. In an apparatus of the character described: a tank containing a liquid; dipping mechanism for dipping a radiator core substantially flatwise into the liquid, said dipping mechanism comprising a carrier guided for vertical motion; a frame pivotally mounted from said carrier and so balanced as to normally maintain a horizontal position, said frame being adapted to support a radiator core resting thereon in a substantially horizontal position; power actuated means for lowering the carrier and elevating it; a manual control for initiating the functioning of said power driven means; and latch means automatically operable to tilt the frame as it is elevated to a position from which it drops by gravity upon release of the latch means to jar the core resting thereon and thereby removing excess liquid therefrom.

5. In an apparatus of the character described: a tank containing a liquid; dipping mechanism for dipping a radiator core into and out of the liquid, said dipping mechanism comprising a carrier guided for up and down motion, a frame

pivotally connected with said carrier and so balanced as to normally maintain a substantially horizontal position, said frame being adapted to support a radiator core to be dipped; power actuated means for lowering the carrier and elevating the same; a manual control for initiating the functioning of said power actuated means; releasable latch means automatically operable on the frame during motion of said carrier to its elevated position out of the liquid to tilt the frame out of its normal substantially horizontal position a substantial amount; and means for releasing the latch means to cause the frame to drop back to its normally horizontal position above the liquid with a sudden jar so that a core resting thereon receives a jolt which removes excess liquid therefrom.

6. In an apparatus of the character described: a tank containing a liquid; a normally substantially horizontal article support movable into and out of the liquid in the tank to immerse an article carried thereby in the liquid; means having a part adjacent to one edge of the article support and engageable with the same during upward movement of the article support out of the liquid for arresting such upward movement of said edge of the article support so that the support is tilted from its normally horizontal position; and means for releasing the support from said part to permit the support to abruptly drop back to its first named substantially horizontal position.

7. In an apparatus of the character described: a tank containing a liquid; a normally substantially horizontal article support movable into and out of the liquid in the tank to immerse an article carried thereby in the liquid; a pivotally mounted latch extending into said tank adjacent to one edge of said support and biased towards said support; a shoulder on the latch engageable with a part on said support to arrest upward motion of said edge of the support so that the support is tilted out of its normally horizontal position during upward motion thereof, said shoudler being so positioned with respect to said part on the support as to permit the support to be lowered into the tank unrestrictedly; and means for disengaging said shoulder from said part on the support to permit the support to drop back to its normally substantially horizontal position above the liquid by gravity so as to jar the article thereon and thereby remove excess liquid therefrom.

8. In an apparatus of the character described: a tank containing a liquid; a carrier in said tank; guide means exteriorly of the tank movably mounting said carrier for translating motion into and out of the liquid; actuating means exteriorly of the tank for imparting such translating motion to the carrier; an article supporting frame pivotally carried by said carrier and so balanced as to normally maintain a substantially horizontal position, said frame being adapted to support an article to be dipped in the liquid; and releasable latch means in the tank automatically operable to tilt the frame about its pivotal connection with the carrier as it is elevated, from which tilted position the frame drops by gravity upon release of the latch means to jar the article thereon and thereby remove excess liquid therefrom.

9. In an apparatus of the character described: a tank containing a supply of liquid; a carrier having spaced substantially parallel arms disposed in said tank; means exteriorly of the tank guiding said carrier for motion into and out of the liquid; a frame pivotally supported on said arms and so balanced as to normally maintain a substantially horizontal position, said frame being adapted to support a radiator core to be dipped into the liquid; power actuated means for lowering and elevating the carrier so that the pivotal connections between the frame and said carrier arms are moved from positions adjacent to the upper edges of the tank to a position adjacent to the bottom of the tank; an abutment engageable with the frame at one side of said pivotal connections during elevation of the frame by said carrier, said abutment being so positioned that continued raising of the carrier toward its position at which said pivotal connections lie adjacent to the upper edges of the tank causes the frame to tilt about the pivotal connections to facilitate the drainage of liquid from the core; and means for disengaging said abutment from the frame to permit the frame to abruptly drop by gravity back to its normal substantially horizontal position and jar the core thereon so as to shake off excess liquid therefrom.

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