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C. PLETSCH

GALVANIZING APPARATUS

Filed May 15, 1924

3 Sheets-Sheet 1

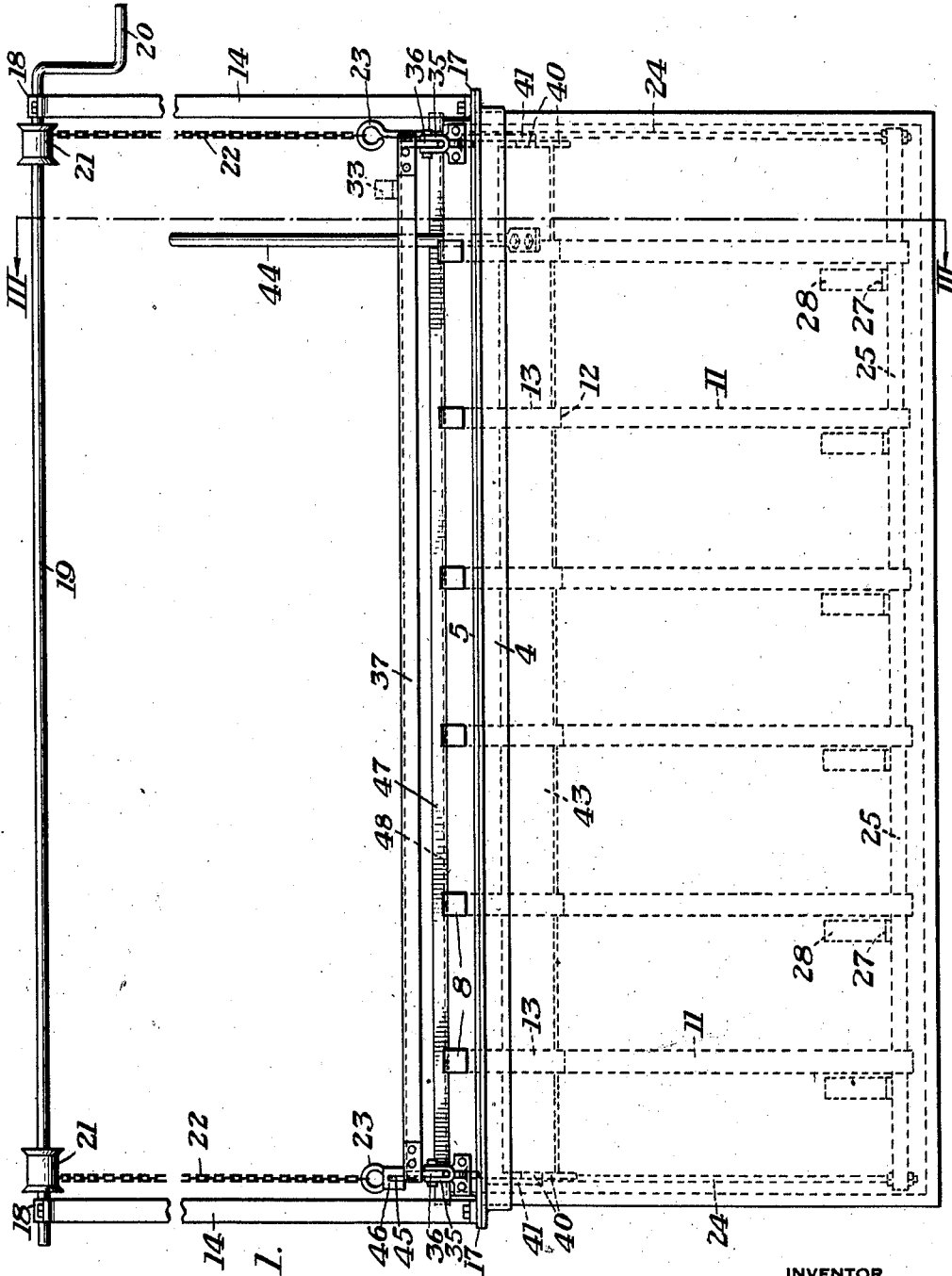


Fig. 1.

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3 Sheets-Sheet 2

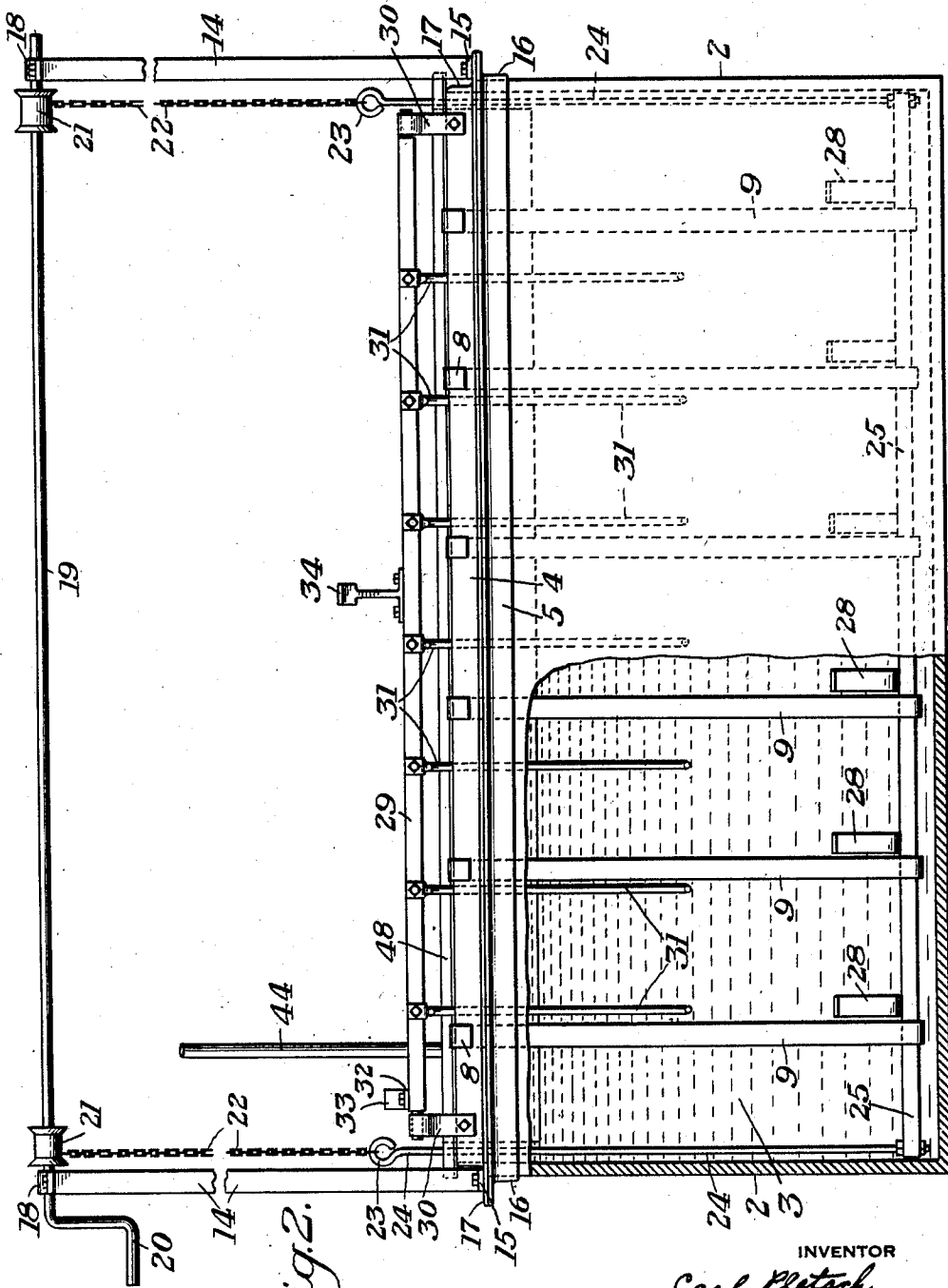


Fig. 2.

INVENTOR

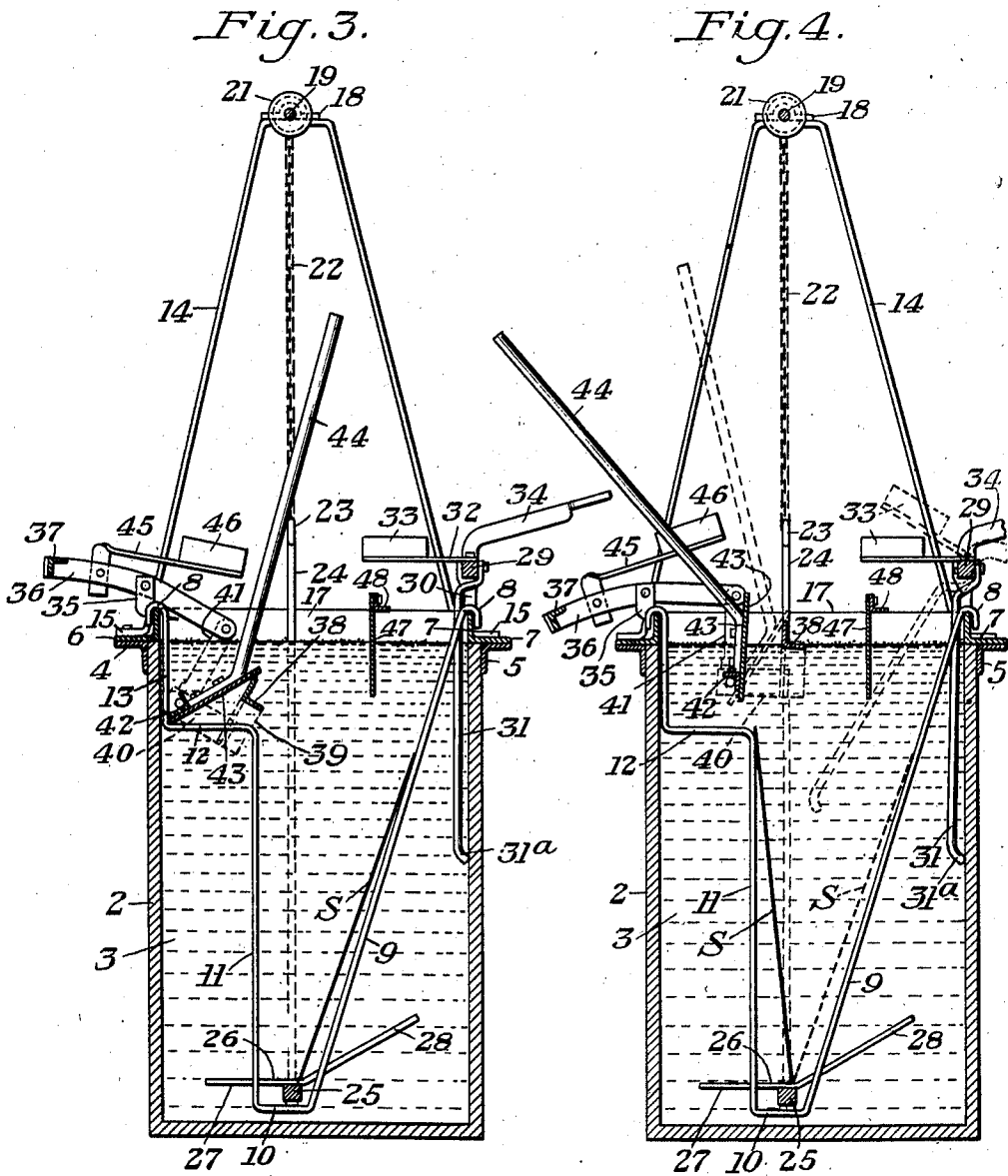
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3 Sheets-Sheet 3



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Patented Feb. 16, 1926.

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# UNITED STATES PATENT OFFICE.

CARL PLETSCH, OF BAD-NAUHEIM, GERMANY.

## GALVANIZING APPARATUS.

Application filed May 15, 1924. Serial No. 713,459.

*To all whom it may concern:*

Be it known that I, CARL PLETSCH, a citizen of Germany, residing at Bad-Nauheim, Germany, have invented certain new and useful Improvements in Galvanizing Apparatus, of which the following is a full, clear, and exact description.

The present invention relates to galvanizing apparatus, and more particularly to galvanizing pots for galvanizing iron or steel sheets or plates by the dipping method.

In the accompanying drawings:—

Figure 1 is a side elevation, looking from the left, Figures 3 and 4, of a galvanizing apparatus embodying a preferred form of my invention.

Figure 2 is a view, partly in section and partly in side elevation, of the apparatus shown in Figure 1, but looking from the right.

Figures 3 and 4 are transverse vertical sections on the line III—III of Figure 1, showing the parts in different positions.

In the illustrated embodiment of the invention, the galvanizing apparatus comprises an oblong rectangular tank 2 which holds the spelter bath 3. The spelter bath is preferably composed of zinc containing a small amount of aluminum, and also a small amount of tin if desired, alloyed therewith and prepared as described in my copending application Serial No. 713,460 filed of even date herewith. Such zinc-aluminum or zinc-aluminum-tin alloy bath is particularly adapted for use in the apparatus of the present invention because of its greater fluidity than that of the usual spelter bath. However, the invention is not dependent upon the particular composition of the spelter bath, the purpose of the invention being to provide a galvanizing apparatus having means for insuring a proper coating of the sheets and permitting the removal of the sheets without contamination by the zinc ashes floating on the surface of the spelter bath.

The term "zinc ashes" is used in the galvanizing art to describe the scum which forms at the surface of the spelter bath and which consists principally of zinc oxide formed by the oxidation of the zinc surface in contact with the air together with such fluxing material as may be carried to the bath by the sheets.

The sheets before being introduced into the bath are preferably coated with zinc chloride as the fluxing material. The zinc

chloride is preferably applied by dipping the sheets into a strong solution of zinc chloride and then drying the sheets to form a film of dried zinc chloride on their surfaces. The surface of the bath is preferably not covered with any layer of sal-ammoniac flux which is commonly employed on spelter baths. The alloy described in my copending application above mentioned retards surface oxidation and no protective layer of flux, sand, coke or the like need be employed when this alloy is used.

Secured in any suitable manner, as by welding, to the outer faces of the sides of the tank, adjacent their upper edges, are angle irons 4 and 5, the horizontal flanges of which are flush with the upper edges of said sides. The angle irons 4 and 5 serve to support the pot in its brick setting (not shown). Other angle irons 6 and 7 have their horizontal flanges secured to and supported on the horizontal flanges of the angle irons 4 and 5 and on the upper edges of the sides of the tank, and have their vertical flanges substantially flush with the inner faces of said sides.

Extending into the bath is a cradle for guiding and supporting the sheets. This cradle is formed of a plurality of spaced bars of generally U shape. These bars have their ends bent over to form hooks 8 which engage the vertical flanges of the angle irons 6 and 7. The right hand side 9 of each bar is inclined to its horizontal portion 10, while its left hand side 11 extends vertically from the portion 10 to a point near the top of the bath, then horizontally to the left hand side of the tank, as indicated at 12, and then vertically, as indicated at 13, to its hooked upper end 8.

Rising from each end of the tank is a standard 14 shaped like an A with the middle horizontal bar omitted. The lower ends of the sides of these standards are bent outwardly to form horizontal feet 15, which are fastened to the horizontal flanges of angle irons 16 and 17 secured to the ends of the tank and forming continuations of the angle irons 4, 5, 6 and 7. Secured to the upper ends of the standards 14 are bearings 18, in which is journaled a horizontal shaft 19 having a crank handle 20 integral with one end thereof. Carried by the shaft 19, adjacent the inner sides of the standards 14, is a pair of winding drums 21. A chain 22 is attached at one end to each drum, and has

its other end connected to an eye 23 formed at the upper end of a vertical rod 24. The rods 24 extend down into the bath and are fastened at their lower ends to a horizontal bar 25 extending longitudinally of the tank above the horizontal portions 10 of the cradle. The bar 25 has a plurality of spaced transverse bars 26 secured to the upper side thereof. Each transverse bar has a horizontal portion 27 and an inclined portion 28. The horizontal portions 27 extend between the vertical sides 11 of the cradle, and the inclined portions 28 extend between the inclined sides 9 thereof. The bar 25 and cross bars 26 form a basket which is operatively connected with the shaft 19 and winding drums 21, by the vertical rods 24 and the chains 22, for lifting the sheets out of the bath, as will be hereinafter explained.

A horizontal bar 29 is arranged a short distance above the upper edge of the vertical flange of the angle iron 7, and is journaled at its ends in brackets 30 secured to said flange. The bar 29 has a plurality of spaced arms 31 secured at one end thereto and extending down into the spelter bath intermediate the sides 9 of the cradle. An arm 32 is secured to the bar 29 and carries a weight 33 which normally maintains the arms 31 in the full line position shown in Figures 3 and 4. The lower ends of the arms are bent laterally so as to contact with the right hand side of the tank and maintain the body portion of the bars out of contact with said side. A foot treadle 34 is secured to the bar 29, whereby the bar may be rocked to move the arms 31 from the full line position to the dotted line position thereof shown in Figure 4. When the pressure is removed from the foot treadle, the weight 33 will immediately return the arms to the full line position shown in Figures 3 and 4.

Secured to the vertical flange of the angle iron 6, adjacent the ends thereof, are brackets 35, each having a bifurcated upper end. Pivoted intermediate its ends, between the bifurcations of each bracket, is a lever 36, the outer ends of the levers being connected by a horizontal angle iron 37. The levers 36 are pivotally connected at their inner ends to a mechanical skimming device. This device comprises a horizontally extending angle iron 38 having its end portions bent downwardly, as indicated at 39. A pair of transversely extending members 40 are secured at one end to the portions 39, and at their other ends to vertically extending members 41. The members 41 are pivotally connected at their upper ends to the angle iron 38, and journaled at its ends in the lower ends of the members 41 and the connected ends of the members 40, is another angle iron 42, the angle iron 42 being positioned below the angle iron 38. The angle iron 42 has a plate 43 secured thereto, this plate nor-

mally engaging the angle iron 38, as shown in full lines in Figure 3 and in dotted lines in Figure 4. The plate has a handle 44 secured thereto, whereby the plate may be swung from the dotted line position to the full line position shown in Figure 4. Normally the weight of the skimming device maintains it in the position shown in Figure 3, in which position the plate 43 is considerably below the surface of the spelter bath. An arm 45 is secured to one of the levers 36, and carries a counter-weight 46.

A plate 47 extends vertically downwardly into the spelter bath in parallel spaced relation to the right hand side of the tank. This plate is secured at its upper edge to an angle iron 48, said angle iron being supported at its ends upon the vertical flanges of the angles 17.

The operation of the apparatus described is as follows: A sheet S to be coated will be dipped into the bath, the sheet being introduced in the space between the plate 47 and the right hand side of the tank. As the sheet is dropped into the bath, its lower edge will slide along the inclined sides 9 of the cradle, until such lower edge engages the inclined portions 28 of the transverse bars 26 of the basket, whereupon said edge will slide along said inclined portions until it engages the horizontal portions 27 of the bars. The sheet will come to rest in the bath in approximately the position shown in full lines in Figure 3, and in dotted lines in Figure 4. It will be seen that the sheet is inclined towards the right hand side of the tank, and that it is only engaged at its upper and lower edges by the sides 9 of the cradle and the bars 26 of the basket, which allows free access of the molten spelter to the surface of the sheet. After the sheet has reached this position, the operator will step on the foot treadle 34 and swing the arms 31 from the full line position shown in Figure 4, the sheet then resting with its lower edge in contact with the horizontal portions 27 of the bars 26, and with its upper edge in contact with the vertical sides 11 of the cradle. The arms contact with the sheet in turning it principally at their curved lower ends 31<sup>a</sup>. After the sheet has been swung into contact with the vertical sides 11 of the cradle, the operator will actuate the bar 37 and raise the skimming device from the lowered position shown in Figure 3 to the elevated position shown in Figure 4, and he will thereafter, by means of the handle 44, swing the plate 43 from the dotted line to the full line position shown in Figure 4. Then the operator will grasp the handle 20 and turn the shaft 19 to wind the chains 22 on the drums 21, and thereby raise the basket formed by the bars 25 and 26. As the basket is raised, the sheet will be moved upwardly through the trough-like space be-

tween the plate 43 and the angle iron 38, the sheet being guided into this space in its upward movement by the contact of its upper edge with the vertical sides 11 of the cradle. It will be understood that in plac-  
 5 ing the sheet in the tank it will be so positioned that when it is raised it will not strike the transverse members 40. When the sheet has been elevated to bring its upper edge above the surface of the bath, such upper edge can be grasped by any suitable mechanical means and the sheet thereby removed from the bath.

There is always some zinc ashes floating on the surface of the spelter bath. The skimming device serves to remove these zinc ashes from the path of the sheet as the latter is withdrawn from the bath. In the normal position of the plate 43, it is inclined and therefore as the skimming device is raised from the position shown in Figure 3 to the position shown in Figure 4, the inclined plate 43 rises through the surface of the bath and acts as a skimmer to skim the surface of the bath of the zinc ashes immediately above this plate, then when the plate 43 is swung from the dotted to the full line position shown in Figure 4, the zinc ashes which are carried on the plate are pushed to the left and the surface of the bath between the plate 43 and the angle iron 38 is cleared of zinc ashes. The angle iron 38 and the plate form a bottomless trough through which the coated sheet emerges from the bath. The surface of the spelter within this trough is freed of zinc ashes so that there is no danger of the coating becoming contaminated as the sheet is withdrawn.

The plate 47 serves to confine the zinc ashes collecting at its right where the sheets are dropped into the bath, from floating to the left where the skimming device operates. There is no particular objection to allowing a fair amount of zinc ashes to collect at the right of the plate 47, since when the sheets are dropped into the bath they push the zinc ashes to one side and the zinc ashes do not tend to adhere to the surfaces of the dropping sheet.

The sheets can be inserted and removed from the bath by the usual tongs, or any suitable mechanical device may be provided for this purpose.

The apparatus is particularly adapted for the galvanizing of heavy sheets or plates which are too stiff to be handled by the usual sheet galvanizing machines in which the sheets are bent as they are passed through the spelter pot.

The term "sheet" as herein employed is intended as a term as general definition and not of limitation and is intended to include the heavy sheets which are sometimes known in the trade as "plates".

While I have shown and described a preferred embodiment of my invention, it will be understood that changes may be made in the details of construction and in the method of operation without departing from the spirit of the invention or scope of the appended claims.

I claim:

1. Galvanizing apparatus, comprising a tank for the spelter bath, a skimmer for removing the zinc oxide from the portion of the bath where the galvanized articles emerge, said skimmer being normally positioned below the surface of the bath and comprising a skimming member hinged to swing about a horizontal axis, and means for raising said skimmer through the surface of the bath and for swinging said member about said axis to effect the skimming operation.

2. Galvanizing apparatus, comprising a tank for the spelter bath, a skimmer for removing the zinc ashes from the portion of the bath where the galvanized articles emerge, said skimmer comprising a plate hinged to swing about a horizontal axis and normally positioned below the surface of the bath, and a member extending parallel to said axis and normally engaged by said plate, and means for raising said plate through the surface of the bath and swinging it about said axis to effect the skimming operation and form with said member a trough through which the galvanized articles emerge.

3. Galvanizing apparatus, comprising a tank for the spelter bath, a skimmer for removing the zinc ashes from the portion of the bath where the galvanized articles emerge, said skimmer being normally positioned below the surface of the bath and comprising a plate hinged at one edge to swing about a horizontal axis, and a downwardly extending member spaced from said axis and normally engaged by said plate, and means for raising said plate and member through the surface of the bath and swinging said plate about said axis to effect the skimming operation.

4. An apparatus for galvanizing sheets, comprising a tank for the spelter bath, a skimmer for removing the zinc ashes from the portion of the bath where the sheets emerge, means for operating said skimmer, and means engageable with the lower edge of a sheet immersed in said bath for raising said sheet through the skimmed portion of the bath, said skimmer comprising a trough through which the sheets emerge.

5. An apparatus for galvanizing sheets, comprising a tank for the spelter bath, a skimmer for removing the zinc ashes from the portion of the bath where the sheets emerge, means for operating said skimmer, means engageable with the lower edge of a

sheet immersed in said bath for raising said sheet through the skimmed portion of the bath, and means arranged to be engaged by the upper edge of the sheet for guiding the sheet while being raised, said skimmer comprising a trough through which the sheets emerge.

6. An apparatus for galvanizing sheets, comprising a tank for the spelter bath, a skimmer for removing the zinc ashes from the portion of the bath where the sheets emerge, means for operating said skimmer, means engageable with the lower edge of a sheet immersed in said bath for raising said sheet through the skimmed portion of the bath, said skimmer comprising a trough through which the sheets emerge and means engageable with the lower edge of the sheet as the latter is lowered into the bath for guiding said lower edge upon said raising means.

7. An apparatus for galvanizing sheets,

comprising a tank for the spelter bath, a skimmer for removing the zinc ashes from the portion of the bath where the sheets emerge, means for operating said skimmer, means engageable with the lower edge of a sheet immersed in said bath for raising said sheet through the skimmed portion of the bath, said skimmer comprising a trough through which the sheets emerge, means arranged to be engaged by the upper edge of the sheet for guiding the sheet while being raised, means engageable with the lower edge of the sheet as the latter is lowered into the bath for guiding said edge upon said raising means, and means engageable with the sheet for swinging the sheet about its lower edge to bring its upper edge into engagement with said guiding means.

In testimony whereof I have hereunto set my hand.

CARL PLETSCH.