

A. NIEDRINGHAUS.
FINISHING GALVANIZED SHEET METAL.
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946,459.

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Fig. 1.

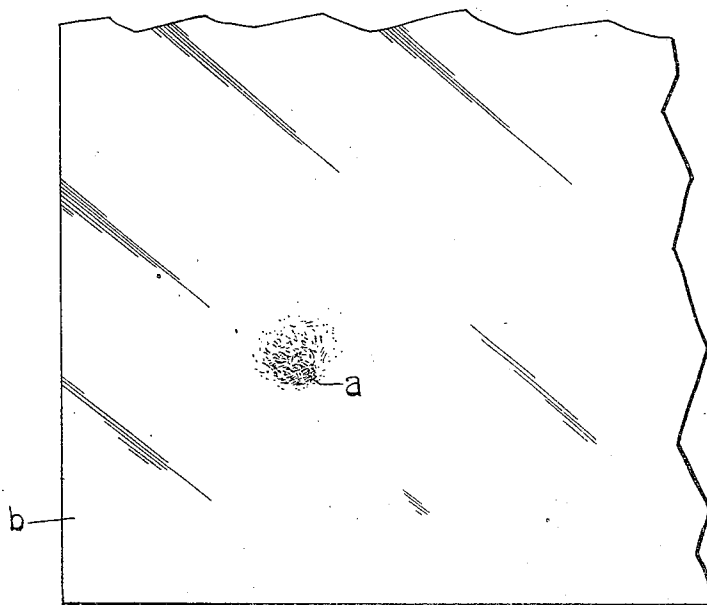
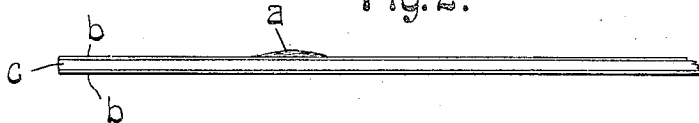


Fig. 2.



WITNESSES

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FINISHING GALVANIZED SHEET METAL.

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To all whom it may concern:

Be it known that I, ALEXANDER NIEDRINGHAUS, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Finishing Galvanized Sheet Metal, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a view of a sheet of galvanized metal illustrating a defect; Fig. 2 is an enlarged edge view illustrating the characteristics of said defect.

This invention relates to a new and useful improvement in finishing galvanized sheets of metal. It is well known that sheets of metal, when galvanized by the use of a spelter bath, will frequently show defects, caused, I believe, by particles of flux adhering to the metal and not being eliminated in the molten bath. These flux particles, when the sheet is removed from the bath, constitute defects which render the sheets so imperfect as to cause them to be discarded. When sheets with these defects are allowed to stand, the spots constituting the defects spread, and eat off or corrode the metal coating and also the iron base.

I have discovered that when sheets of metal are galvanized by a lead and spelter bath, the sheet first passing through the flux box, then through the lead bath and finally up through the spelter strata which floats on the lead bath, that said sheets also contain defects or blemishes, to all external appearances, the same as those existing in sheets galvanized in the spelter bath, where no lead is used. It has been the practice heretofore to also discard these sheets.

In Fig. 1 of the drawings I have illustrated a portion of a galvanized sheet of metal in which there is represented at *a* a defect.

In Fig. 2 which is an enlarged cross sectional view of a galvanized sheet of metal with a defect, said defect *a* is illustrated as a surface blemish, lying above the galvanizing coating *b*. *c* is the sheet of metal which is galvanized.

I believe when a sheet of metal is galvanized in a lead and spelter bath, that the lead, which exercises a cleaning action with respect to the sheet of metal which is passed

through the flux box, cleanses the surface of the metal by displacing particles of flux tending to adhere to the sheet. The pressure of the lead is, of course, considerable and as the sheet passes through the flux box and enters the lead, the lead tends to clean the sheet by displacing all of the particles of flux adhering thereto. Should the particles of flux persist in adhering to the lead, the cleansing action of the lead becomes stronger as the hydro-static pressure increases, and the chances are, that eventually the particle will be dislodged. If the dislodged particle is on the upper surface of the sheet, it may rise to the surface of the molten lead, passing between the guide fingers, in the kettle. If, however, the particle is on the under surface of the sheet, it is prevented from rising and is carried by the sheet upwardly and out through the spelter strata. The dislodgment of the particle, however, has enabled the molten lead to exert its cleansing tendencies upon the surface of the sheet with the result that there is left upon the sheet a slight coating of lead which is noticeable when the finger is rubbed over the surface, said coating resembling graphite in appearance. This coating, apparently, is sufficient to prevent close adhesion between dislodged particles of flux to the sheet and consequently the spelter readily takes hold of the sheet and will be deposited practically uniformly throughout its surface, even extending under foreign particles on the surface of the sheet. When the sheet passes through the squeezing rolls, these particles are, of course, spread out upon the sheets and appear as defects.

The squeezing rollers which are partially submerged at the discharge end of the kettle and whose function is to determine the thickness of the galvanized coating on sheet are, in practice, themselves galvanized, so that the molten spelter constituting the film of galvanizing material thereon will readily squeeze off the surplus metal and yet permit the sheet to pass beyond with its galvanizing coating. To have these squeezing rollers take up and hold the film of molten spelter, flux is periodically sifted upon the squeezing rollers, or poured thereon if in the form of liquid, and it is possible that the flux thus applied to these rollers, particularly when it is in the form of crystals, will adhere to the surface of the galvanized sheet and constitute a defect or blemish heretofore referred to. These defects or blemishes yield to the

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treatment hereinafter described as readily
as the defects or blemishes first mentioned.
Indeed, the outer surface of the galvanized
sheet of metal appears to be coated with a
5 thin film of lead resembling graphite in ef-
fect, which film is acquired in the passage
of the sheet through the bath. I believe,
that this film, which I have called a lead film,
is some form of lead chemically combined
10 with other elements floating above the sur-
face of the lead and being distributed over
the surface of the galvanized coating in the
operation of galvanizing.

I have discovered that it is possible to re-
15 move these defects by a burnishing brush,
and my invention is based upon such dis-
covery. I, therefore, propose to employ, in
removing defects from sheets galvanized
with a bath composed of lead and spelter, a
20 burnishing brush, wire brush, or some other
mechanical device which, by friction, or by a
direct cutting action, will remove these de-
fects and blemishes so that the sheet so
treated will expose to view a perfect, un-
25 broken galvanized coating.

I prefer to practice my invention imme-
diately after the sheets come from the gal-

vanized bat and before they become cold.
The warm plates yield more readily to my
treatment than the cold plates, although the 30
invention of course can be practiced some
considerable time after the sheets have been
galvanized. In either event, the metal is
completely solidified so that it can be han-
dled and examined for the purpose of dis- 35
covering the blemishes, preparatory to clean-
ing the plate by removing them.

Having thus described my invention, what
I claim is:

The art of removing spots from a galvan- 40
ized sheet which has been prepared in a lead
and spelter bath, which consists in allowing
the galvanized sheet to become sufficiently
cool and then to mechanically remove spots,
constituting defects or blemishes, and finally 45
polishing the spotted surface.

In testimony whereof I hereunto affix my
signature in the presence of two witnesses,
this 8th day of March, 1909.

ALEXANDER NIEDRINGHAUS.

Witnesses:

F. R. CORNWALL,
LENORE CLARK.