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J. L. HERMAN

METAL COATED IRON OR STEEL ARTICLE

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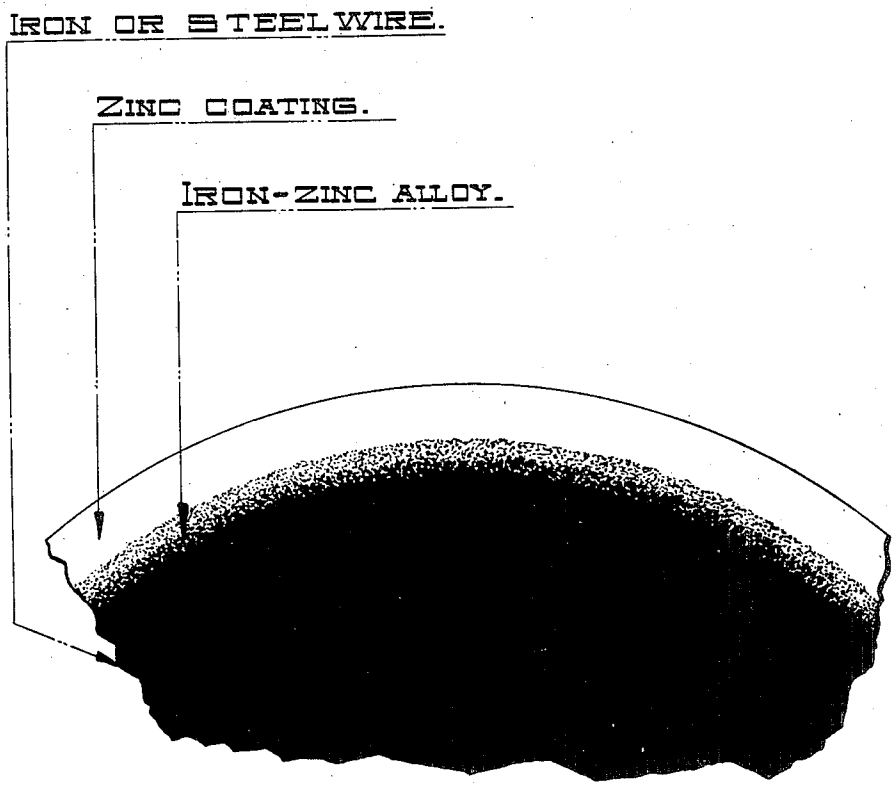

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JOSEPH L. HERMAN, OF PEORIA, ILLINOIS.

METAL-COATED IRON OR STEEL ARTICLE.

Application filed July 12, 1923. Serial No. 651,128.

To all whom it may concern:

Be it known that I, JOSEPH L. HERMAN, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented a new and Improved Metal-Coated Iron or Steel Article, of which the following is a specification.

My invention consists in providing a protective coating for articles of iron or steel, composed of a heavy coating of zinc spelter, said coated article having been heat-treated in such a manner as to produce new and useful properties therein.

It has been found that when an ordinary coating of zinc spelter is applied to iron or steel articles by a continuous process, for example, iron or steel wire, that the coating, unless wiped and consequently made thin, is very brittle, and will not stand fabrication, especially if the wire is to be formed into shapes or subjected to abrasion such as it would be in fence-weaving machines or machines for the manufacture of barbed wire and the like.

The object of my invention is to provide a heavy coating of zinc spelter for the iron or steel articles in such a manner as to obviate the necessity of either wiping the coating smooth or making the coating thin in order that said coating be flexible and malleable.

The figure represents in cross section an iron or steel wire with an unwiped heavy coating composed of zinc spelter and zinc and iron so proportioned to the zinc surface by heat-treatment that a maximum resistance to corrosion is obtained, and for convenience the figure has been marked by the words "Zinc coating," "Iron or steel wire" and "Iron-zinc alloy" to indicate the respective characteristics of the article and coating.

I have found that by passing an iron or steel article through a zinc spelter bath in the usual manner and then, without wiping the coating so formed, allow it to be passed through a furnace maintained at a suitable temperature, I subject the coating to a heat-treatment which not only smooths said coating but causes it to remain flexible and malleable which is not true in the case of heavy zinc coatings applied in the ordinary or usual manner.

I have also found that my method produces zinc coating on, for example, wire, which not only effectively resists corrosion but is also heavy enough to withstand a long period of corrosion. The heavy coating as a result of my improved method of practice adheres firmly to the under-lying iron or steel base and does not strip or flake off, whereas in the ordinary galvanized wire where a heavy coating of zinc is applied, the zinc strips from the iron or steel base very easily by merely bending the iron or steel.

The zinc coating applied by my process is of a uniform gray appearance, the surface not having the usual galvanized appearance but having a sort of matte surface. The surface of my product, therefore, does not have the smooth greasy feel of the ordinary galvanized iron or steel article but has a distinctive feel due to said matte surface.

Iron or steel articles when galvanized by my process can be bent around a much shorter radius than can articles heavily galvanized by any process known to me without material injury to the coating. Wire galvanized by my process can be bent around its own diameter without cracking as contrasted with the ease with which heavy galvanized coatings applied by ordinary processes crack off when bent around even a much larger diameter.

Typical examples of wire coated by my process are approximately as follows: For example, I take four No. 11 gauge wires, (diameter 0.1205 inch) designated as "A", "B", "C", and "D", and which travel at the rate of approximately one hundred feet per minute. After said wires emerge from the molten spelter bath and without wiping, I pass them through a heat-treating furnace where they will be subjected to a heat of approximately 1250° F. for a period of approximately twenty seconds. I then obtain coated wires some of whose characteristics are given in the following table:

	Oz. of coating per sq. ft. of surface.	Lbs. of coating per ton.	Per cent iron in zinc coating.	Copper sulphate tests.
"A"	0.631	60.9	8.85	6
"B"	0.556	54.0	8.92	5
"C"	0.616	59.0	8.33	6
"D"	0.700	67.5	8.19	6

The high percentage of iron as shown in the above table is an important feature and

is due to the heat-treatment which the wire receives after leaving the galvanizing bath. This heat-treatment results in a further alloying of the zinc and iron and it is this alloying action which, I believe, gives the coating its excellent mechanical properties. The resistance to corrosion is also increased by the proper proportioning of the zinc-iron alloys to the pure zinc surface.

Another important feature of coatings applied by my process is the high number of one minute immersions in copper sulphate which the article will stand as compared with ordinary galvanized coatings. The latter will stand only one to three such tests, whereas coatings applied by my process will stand four, or better, copper sulphate immersions which further emphasizes the excellence of the adherence of the coating to the iron base.

The terms and expressions which I have employed are used as terms of description and not of limitation and I have no intention in the use of such terms and expressions, of excluding any equivalent for the features shown and described, but recognize that various modifications are possible within the scope of the invention claimed.

What I claim is:—

1. An article composed of iron or steel with a coating of zinc spelter, said article having been heat-treated in such a manner as to make the coating flexible and malleable at ordinary temperatures.

2. An article composed of iron or steel with a heavy coating of zinc spelter, said article having been heat-treated in such a manner as to make the heavy coating flexible and malleable at ordinary temperatures.

3. An article composed of iron or steel with an unwiped coating of zinc spelter, said article having been heat-treated in such a manner as to make the coating flexible, malleable and smooth.

4. An article composed of iron or steel with an unwiped heavy coating of zinc spelter, said article having been heat-treated in such a manner as to make the heavy coating flexible, malleable and smooth.

5. An article composed of iron or steel with a coating whose exterior is substantially zinc and whose interior is substantially iron, the proportion of zinc gradually decreasing from the outer part to the inner part and the iron gradually decreasing from the inner part to the outer part, said article having been heat-treated in such a manner as to make the coating flexible, malleable and smooth.

6. An article composed of iron or steel with an unwiped heavy coating of zinc spelter and zinc and iron, the zinc and iron so proportioned to the zinc surface by heat-treatment of the coated article, that a maximum resistance of the coated article to corrosion is obtained.

7. An iron or steel wire having a coating composed of zinc spelter, which wire has been heat-treated in such a manner as to make the coating flexible and malleable at ordinary temperatures.

8. An iron or steel wire having a heavy coating composed of zinc spelter, which wire has been heat-treated in such a manner as to make the heavy coating flexible and malleable at ordinary temperatures.

9. An iron or steel wire having a coating whose exterior is substantially zinc and whose interior is substantially iron, the proportion of zinc gradually decreasing from the outer part to the inner part and the iron gradually decreasing from the inner part to the outer part, said wire having been heat-treated in such a manner as to make the coating flexible, malleable and smooth.

10. An iron or steel wire having an unwiped heavy coating of zinc spelter and zinc and iron, the zinc and iron so proportioned to the zinc surface by heat-treatment of the wire, that a maximum resistance of the coated wire to corrosion is obtained.

JOSEPH L. HERMAN.