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PROCESS OF MAKING PROTECTED METAL

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This invention has reference to metallic articles which are coated with a protective coating of zinc.

The invention has for its principal object to improve the zinc coating applied to rimmed or open steel and especially wire drawn from such steel.

The invention has for a further object to subject iron or steel wire produced from rimmed or open steel, to a drawing operation which consists in first passing the wire through a drawing lubricant which has mixed therewith certain metallic salts; then annealing the wire and finally coating the wire with a protective coating of zinc.

A further object of the invention is to provide a drawing lubricant which is mixed with a metallic salt or salts, as for example—copper carbonate, sodium carbonate, potassium carbonate, zinc carbonate or copper hydroxide and drawing the iron or steel wire through this mixture of lubricant and metallic salts before the initial drawing step; annealing the wire when it has been drawn to a predetermined gauge or diameter and finally coating the wire with a protective coating of zinc.

I have found that when iron or steel wire has been subjected to a drawing step and drawing the same through a lubricant mixed with a metallic salt and subsequently galvanized with a protective coating of zinc, the zinc has a more adherent bond to the iron or steel base; that in the case of wire the zinc coating will withstand a bend around its own diameter and other deforming and abrasive actions without disturbance and that a more adherent heavy protective coating of zinc may be applied to the iron or steel base than with ordinary methods.

In practicing the invention, any of the above mentioned salts is mixed with a wire drawing lubricant, preferably a composition of saponified animal, vegetable and mineral oil. The percentage of salts may vary from 20% to 70%, depending on the operation involved and the characteristics of the salts used. While I have mentioned copper carbonate, sodium carbonate, potassium carbonate, zinc carbonate and copper hydroxide as being metallic salts or bases which have been found useful, I do not intend thereby to limit the field and scope to which one may go in the use of metallic carbonates or hydroxides. I have obtained excellent results with a mixture comprising a wire drawing lubricant and zinc carbonate because of the longer die life with the use of such a composition. It is pointed out that when drawing certain types of wire one may want a rich lubricant, whereas with other types of wire

one may want to add lime to provide a dry lubricant. Therefore it should be obvious that I do not wish to be limited to the composition of the lubricant itself, any more than I desire to be limited to the kind of metallic carbonates or hydroxides used. Considerable latitude is desirable and will be oft times necessary to meet certain mill conditions and specifications.

The use of the invention is not limited to either type of wire drawing operations—continuous or intermittent. It may be successfully used with both and has been so used. It is preferable to employ the invention in connection with the drawing of a wire rod, in which event, the rod would be cleaned in the accustomed manner, then limed as usual, baked and then drawn through the special lubricant defined herein, such composition being placed at the first die stand. This would be followed whether or not the operation is to be continuous or intermittent. The one application of the special lubricant is all that is necessary, as the lubricant will be drawn through with the first draft, and follow through with the several successive drafts thereafter.

The action of the metallic carbonates when applied with the wire drawing lubricant to rimmed or open steel before galvanizing has the effect, I believe, of forcing a small amount of carbon dioxide gas into the surface of the iron or steel so that the surface of the article is pitted or etched and thereby rendered more susceptible to attack by the zinc and gives the coating more adherence and bonding with the iron or steel base than with any ordinary method. While I have obtained beneficial results mixing copper hydroxide with the drawing lubricant, I am not fully certain of the action on the surface of the iron or steel base.

It is obvious that those skilled in the art may vary the details of the procedure without departing from the spirit of the invention, and therefore it is not desired to be limited to the above disclosure except as may be required by the claims.

What I claim is:—

1. The process of making zinc coated iron or steel wire from rimmed steel, which consists in drawing the wire to a desired gauge through a lubricant mixed with a metallic salt or salts to pit or etch the surface of the same, then annealing the wire and finally passing the wire through a bath of molten zinc.

2. The process of making zinc coated iron or steel wire from rimmed steel, which consists in drawing the wire to a desired gauge through a

lubricant mixed with a metallic carbonate or carbonates to pit or etch the surface of the same, then annealing the wire and finally passing the wire through a bath of molten zinc.

5 3. The process of making zinc coated iron or steel wire from rimmed steel, which consists in drawing the wire to a desired gauge through a lubricant mixed with zinc carbonate to pit the surface thereof, then annealing the wire and
10 finally passing the wire through a bath of molten zinc.

4. The process of making zinc coated iron or steel wire from rimmed steel, which consists in drawing the wire to a desired gauge through a
15 lubricant mixed with a metallic salt or salts whereby to lessen friction of the steel surface on the drawing die or dies and to etch the surface of the wire, then annealing the wire to obtain desired physical properties and finally passing the wire through a bath of molten zinc.
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5. The process of making zinc coated iron or steel wire from rimmed steel, comprising drawing the wire to a desired gauge; and before the initial drawing step drawing the wire through a
25 lubricant mixed with a metallic salt or salts to etch the surface thereof; annealing the wire after drawn to gauge for zinc coating and finally passing the wire through a bath of molten zinc.

6. The process of zinc coating an iron or steel
30 wire comprising a core of rimmed steel whereby

to obtain an adherent coating of zinc on the surface of the wire, which consists in drawing the wire to gauge; and before the initial drawing step drawing the wire through a lubricant mixed with a metallic salt or salts to roughen the surface of the wire; annealing the wire at the desired gauge and finally subjecting the annealed wire to a bath of molten zinc. 5

7. The process of zinc coating an iron or steel wire comprising a core of rimmed steel whereby to obtain an adherent coating of zinc on the surface of the wire, which consists in drawing the wire to gauge; and before the initial drawing step drawing the wire through a lubricant mixed with a metallic carbonate or carbonates to pit
15 or etch the surface of the wire; annealing the wire at the desired gauge and finally subjecting the annealed wire to a bath of molten zinc.

8. The process of zinc coating an iron or steel wire comprising a core of rimmed steel whereby to obtain an adherent coating of zinc on the surface of the wire, which consists in drawing the wire to gauge; and before the initial drawing step drawing the wire through a lubricant mixed
25 with zinc carbonate to roughen the surface of the wire; annealing the wire at the desired gauge and finally subjecting the annealed wire to a bath of molten zinc.

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