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METHOD OF MAKING RUST RESISTING METAL PLATED WIRE

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Fig. 1.

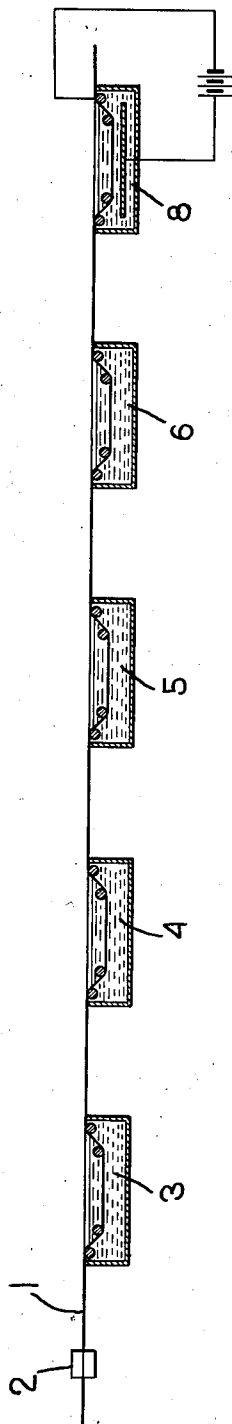
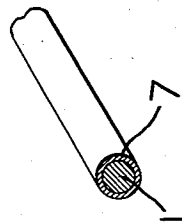


Fig. 2.



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METHOD OF MAKING RUST RESISTING
METAL PLATED WIRE

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4 Claims. (Cl. 91—70.2)

This invention relates to the production of ferrous wire having a rust-resisting metallic coating and it has for one of its objects to provide a wire having an improved rust-resisting metallic coating, and for another object to provide an improved method of making such a wire.

One well-known way of increasing the corrosive resisting qualities of ferrous metal is to subject it to a galvanizing process by which the metal is provided with a coating of zinc, this usually being done by dipping or submerging the metal in a bath of molten zinc.

Where a ferrous wire is thus provided with a zinc coating by being submerged in a bath of molten zinc, it is found that minute pinholes are apt to be found in the zinc coating with the result that portions of the wire where the minute pinholes occur will not be protected by the zinc coating. Where this condition exists the wire is not rust-proof as it will rust or corrode at the minute exposed points.

In carrying out my invention I first provide the wire with a coating of an alloy containing zinc, such, for instance, as a zinc-cadmium alloy, and then I provide the alloy-coated wire with a coating of tin.

I have discovered that when the tin coating is applied to the zinc alloy coating, said tin coating not only fills any pinholes which may exist in the alloy coating and thus completely covers the wire, but it also amalgamates to a certain extent with the zinc alloy coating to produce a coating for the wire in the nature of an alloy of zinc and tin as distinguished from two separate superposed coatings comprising an under coating of zinc alloy and an outer coating of tin.

Experiments which I have made also indicate that the metallic coating in the nature of a zinc-tin alloy with which the wire is thus provided has better rust-resisting qualities than the tin coating itself.

If the zinc alloy is one containing cadmium, the passage of the zinc-cadmium coated wire through the bath of molten tin will produce on the wire a coating in the nature of a zinc-cadmium-tin alloy.

A coated wire embodying this invention and made in accordance with these methods is capable of general use wherever it is desired to use a wire having high rust-resisting qualities.

My invention can also be utilized advantageously in producing wire having a coating of copper, brass or the like for the wire which is provided with the above-described alloy coating may be readily provided with an additional coating of

copper, brass or the like by the electroplating process as a result of which there will be produced a rust-resistant wire having a coating of copper, brass or the like.

Fig. 1 is a diagrammatic view partly in section of an apparatus suitable for carrying out my process.

Fig. 2 is a diagrammatic sectional perspective view of the coated wire.

In the accompanying drawing I have illustrated diagrammatically one way of practising the invention and producing a ferrous wire having the metallic coating in the nature of a zinc-tin alloy. In the drawing, 1 indicates the ferrous wire to be coated. The wire is first cleaned in some suitable way either mechanically or by an application of acid thereto or both and in the drawing I have illustrated diagrammatically at 2 a mechanical-cleaning device for mechanically cleaning the wire, and at 3 is illustrated a vat containing acid and through which the wire is passed. After the wire is cleaned it is provided with a coating of zinc alloy and I will preferably use an alloy of zinc and cadmium. Such zinc alloy coating may be applied to the wire by first applying to the wire suitable flux and then passing the wire through a bath of molten zinc and cadmium. In the drawing, 4 indicates a bath containing flux material through which the wire is passed and 5 indicates a bath of molten zinc alloy such, for instance, as molten zinc and cadmium.

When the wire comes out of the bath 5 it will have the zinc-cadmium coating which, however, may present numerous minute pinholes where the wire is exposed. After leaving the zinc-cadmium bath 5 the wire is taken through a bath 6 of molten tin and as the wire passes through the bath of molten tin, it receives a coating of tin which, however, amalgamates more or less with the zinc alloy coating thereby to produce a single coating on the wire in the nature of a zinc tin alloy as distinguished from two separate superposed coatings comprising an under coating of zinc alloy and an overlying coating of tin. If the zinc alloy is a zinc-cadmium alloy then when the wire emerges from the bath 6 of molten tin, it will have a coating in the nature of a single coating of zinc-cadmium-tin alloy. The tin coating fills any pinholes which exist in the zinc alloy coating and the wire comes out of the tin bath with a smooth finish free from pinholes and which entirely coats or covers the wire. Where cadmium is used in the zinc alloy for coating the wire the proportions of zinc and cadmium in the alloy 55

may be varied without departing from the invention. I prefer, however, to use an alloy which has a preponderance of zinc and find that an alloy which contains at least twice as much zinc as cadmium gives excellent results.

As stated above, I have found that the coating which the wire has after coming out of the tin bath is not only in the nature of a single coating as distinguished from two separate superposed coatings, but the coating has a much greater rust-resisting quality than has a tin coating. By this method, therefore, I have provided a wire with a metallic coating having very high rust-resisting qualities and also which presents a smooth surface and has all the effect of a single coating.

This is illustrated in Fig. 2 which shows greatly exaggerated and more or less diagrammatically a sectional perspective view of the coated wire. In this view the wire itself is shown at 1 and the coating in the nature of the zinc-cadmium-tin alloy is indicated at 7.

For some purposes it may be desirable to use a wire having high rust-resisting qualities and which also is provided with a coating of copper, brass or the like. The wire shown in Fig. 2 is excellently adapted for making a copper-coated or a brass-coated wire. This copper coating or brass coating can be applied to the wire in any convenient way, one way being by the electroplating process.

After the wire has received its zinc-cadmium-tin coating, then said wire may be passed through an electroplating apparatus indicated generally at 8 by which a coating of copper, brass or the like will be applied thereto.

Although I have illustrated the operation of

providing the wire with an electro-plated coating, yet the invention would not be departed from by omitting the electroplating coating step as for many uses the wire provided with the zinc-tin alloy coating is suitable.

I claim:

1. The process of treating ferrous wire which consists in applying to the wire a coating of a zinc-cadmium alloy and immediately thereafter passing the wire through a bath of molten tin thereby providing the wire with a coating in the nature of a zinc-cadmium-tin alloy and then electroplating the already-coated wire.

2. The process of treating ferrous wire which consists in applying to the wire a coating of a zinc-cadmium alloy and immediately thereafter passing the wire through a bath of molten tin thereby providing the wire with a coating in the nature of a zinc-tin alloy and then electroplating the wire.

3. The process of providing ferrous wire with a rust-resistant metal coating which comprises applying to the wire a coating of a zinc-cadmium alloy which contains approximately twice as much zinc as cadmium and subsequently passing the wire through a bath of molten tin, thereby producing on the wire a coating in the nature of a zinc-cadmium-tin alloy.

4. The process of providing ferrous wire with a rust-resistant metal coating which comprises cleaning the wire, passing the wire through a bath of flux material, then passing the wire through a bath containing a molten alloy of zinc and cadmium and subsequently passing the wire through a bath of molten tin.

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