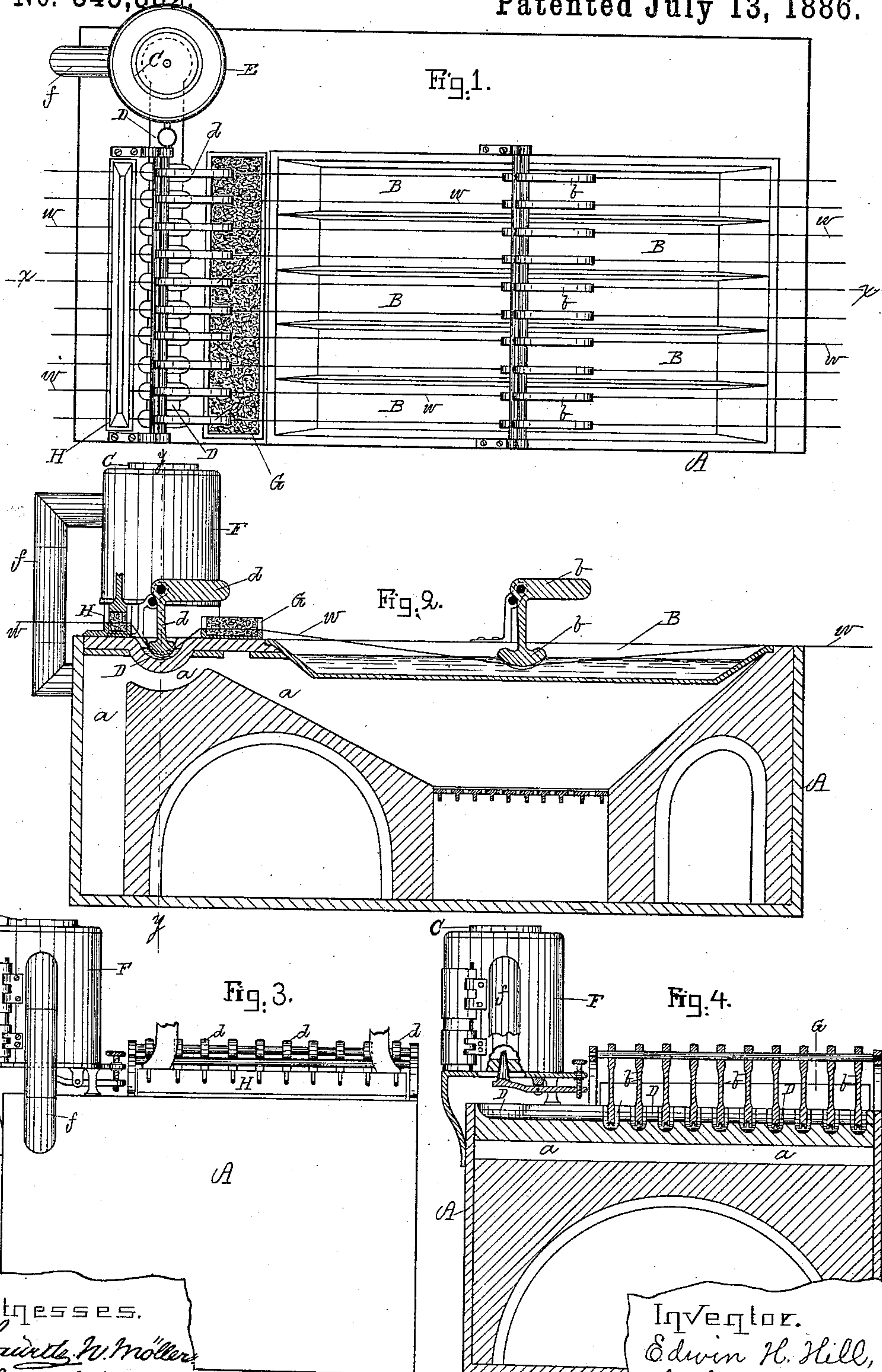


(No Model.)

E. H. HILL.  
COATING WIRE WITH ZINC.

No. 345,382.

Patented July 13, 1886.



Witnesses.

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# UNITED STATES PATENT OFFICE.

EDWIN H. HILL, OF WORCESTER, MASSACHUSETTS.

## COATING WIRE WITH ZINC.

SPECIFICATION forming part of Letters Patent No. 345,382, dated July 13, 1886.

Application filed October 16, 1885. Serial No. 180,061. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN H. HILL, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Coating Wire with Zinc or like Metal, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

Heretofore it has been deemed necessary to melt up a quantity of zinc so large that the wire could be carried through it directly from the acid bath, the wire when it entered the molten metal being cold or at atmospheric temperature, and the heat of the molten metal serving to dry off the acid, and also heat the wire. This necessarily chilled some of the metal and made it essential that the quantity chilled should be a trifling per cent. of the metal in the bath. One of the main practical objections to the use of this large quantity of metal in the bath is that the quantity of "dross" formed is very great, fully half the zinc being wasted, for the so-called "dross" is wholly unfit for cutting wire. Moreover, besides the loss of zinc in the form of dross, the expense of removing the dross from the bath is large. The dross also frequently adheres in sufficient quantity to the wire to make imperfect work.

The main object of my invention is to do away with these objections; and my invention consists, primarily, in a galvanizing apparatus in which the coating-bath containing the melted zinc is supplied with melted zinc as the zinc in the coating-bath is taken up by the wires passing through it, and in which the wires are properly heated before they enter the coating-bath, these two features—namely, the ready supply of melted zinc and the preheating of the wires—making practical the use of a very small coating-bath, containing at any given time only a small percentage of the melted zinc required in any other apparatus known to me.

As will now be clear, the problem which I sought to solve was how to coat the wires by carrying them through the minimum quantity of melted zinc, and I have solved that problem by preheating the wires to prevent chilling the small quantity of melted zinc in the coating-bath, and by providing a constant supply of melted zinc to the coating-bath to

keep the quantity of melted zinc in the coating-bath practically constant. With this contrivance the quantity of molten metal in the bath can be readily reduced to a small per cent. of that required in baths as heretofore used, and the quantity of dross formed will be trifling.

In order to prevent the undue chilling of the small quantity of metal used in my bath, it is necessary to heat the wire before it enters the bath, and the best way known to me for doing this is to carry the wire from the acid bath through a bath of molten metal, preferably a mixture of tin and lead, (say two pounds lead to one pound of tin.) This bath dries off the acid and heats the wire just as the zinc bath does in the old apparatus; but when an alloy of tin and lead is used dross is not formed, as in the zinc bath of the old apparatus. The wire is also coated with a thin film of the alloy, and this coating unites with the molten zinc of the smaller bath, and the final coating of the wire is a film of zinc mixed with a small quantity of tin and lead. This coating is in all respects equal to the ordinary zinc coating, and in some respects superior.

In the drawings, Figure 1 is a plan. Fig. 2 is a section on line *x x*, Fig. 1; and Fig. 3 is an end view of the best form of apparatus now known to me. Fig. 4 is a section on line *y y*, Fig. 2.

The furnace represented by A is of any suitable construction, its main function being to keep the metal in the bath B melted, and to heat the bath D, so that the melted zinc in it shall not be chilled. The zinc in the reservoir C is kept melted, preferably by an additional furnace, F, which I have shown connected by pipe *f* to the flue *a* of the main furnace A; but obviously the reservoir C may be heated from the main furnace A, this being a mere question of convenience.

Suitable means are requisite for keeping the bath D supplied with melted zinc (or like metal) from the reservoir C. I have found a valve, J, controlled by a lever, *j*, and screw *j'*, as shown in Figs. 3 and 4, to answer well, the melted zinc flowing, when the valve is open, from the reservoir C into bath D, and its flow being regulated by the screw, as will be readily understood.

I have shown the bath B as partitioned off



into a number of compartments. This is in order to reduce the quantity of metal necessary to fill the bath to the proper level.

The operation is as follows: The wire *w* is led from the acid bath (not shown) through the melted metal in the bath B, being guided by the foot *b*, or in any other suitable way, as will be clear from Fig. 2. From the bath B it passes through the wiper C, (preferably a mass of asbestos,) by which the metal from bath B is wiped nearly off, the film that remains being beneficial rather than otherwise; but, as will be clear from what has been said above, the main function of the bath B is to heat the wire without impairing it for immersion in the zinc (or like metal) in the bath D, and while the wire is still hot, being guided by the foot *d*, or in any other suitable way. From the bath D the wire passes through the wiper H, (preferably of asbestos, as in my Patent No. 204,571, dated May 18, 1878.)

It will be clear that the details of construction may be varied largely, as they have little to do with my invention, which consists in passing the wire through a bath of melted zinc (or like metal) which is kept supplied from a reservoir of the melted metal, as above described, whatever be the particular construction of the apparatus used, so long as it consists of suitable means for heating the wire, (whether the bath B or any other proper heating apparatus,) in combination with a bath, D, and a reservoir, C, for keeping the bath D supplied with the melted zinc (or like metal) as it is taken up by the wire.

In practice it is usual to coat a number of wires at one operation, and I have shown in the drawings an apparatus designed for ten wires, as will be understood by all skilled in this art.

The bath B is of cast-iron, as usual; but the bath D is best made of fire-brick or like material, in order to reduce the dross to a minimum, the dross forming always when melted zinc is in a vessel of iron; but even if the bath D be of iron the quantity of dross is trifling, because of the small quantity of zinc in the bath D, and also because it is constantly being taken off by the wire and new zinc introduced to replace that taken away.

I am aware of Letters Patent No. 269,022 of 1862, and No. 310,993 of 1885, and disclaim all that is shown in them.

I am also aware of British Patent No. 1,639 of 1863, which speaks of an additional reservoir, but does not show the three essential elements of my combination—namely, the preheating-bath of melted metal, the coating-bath, and the source of supply to keep the coating-bath properly filled. My invention also differs widely from that shown in United States Patent No. 183,186, of 1876, which lacks both the source of supply for the coating-bath, and also the preheating-bath of melted metal, both of which are essential elements of my combination.

I disclaim preheating by carrying the wire through a furnace, as described in Patent No. 183,186, as it is impractical to coat wire with zinc by carrying the wire from the acid bath through a furnace, and thence through the coating-bath, for the surface of the wire will be thereby rendered unfit to receive the coating of zinc, while with my apparatus the surface of the wire is rendered better adapted to receive the zinc coating by reason of the fact that it receives a thin film of metal from the melted metal of the preheating-bath before it comes in contact with the melted zinc in the coating-bath, this being one main feature of novelty of my invention, as it is mainly because of this that I am enabled to use a quantity of metal in the coating-bath far smaller than the quantity essential in any other galvanizing apparatus known to me.

What I claim as my invention is—

1. In a galvanizing apparatus, the zinc coating bath described, combined with a source of supply of melted zinc to keep the coating-bath properly supplied as the melted zinc is taken up by the wire, and with a bath of melted metal, by which the surface of the wire is coated with a film of melted metal, and the wire is also heated before it passes through the coating-bath, the three elements being combined and arranged substantially as described.

2. The preheating-bath B, coating-bath D, and wipers G and H, in combination with furnace A, arranged, as described, to heat both baths B and D, all substantially as set forth.

EDWIN H. HILL.

Witnesses:

LEDYARD BILL,  
DAVID MANNING, Jr.