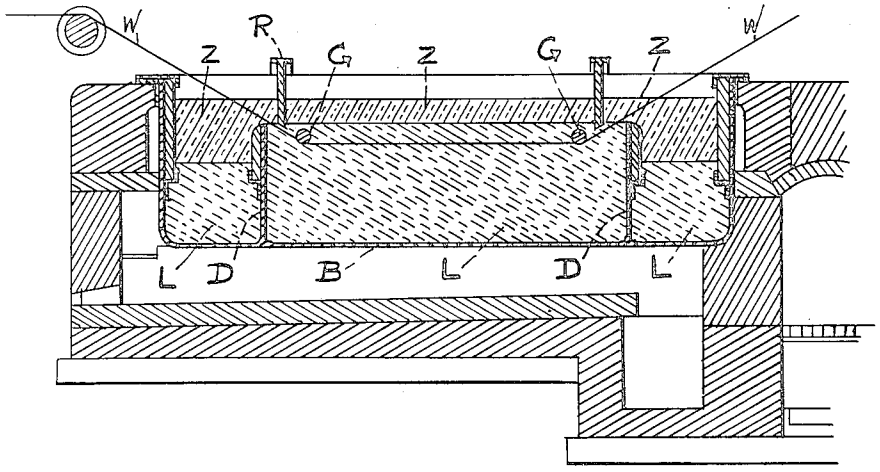
N. K. TURNBULL.

GALVANIZING BATH.

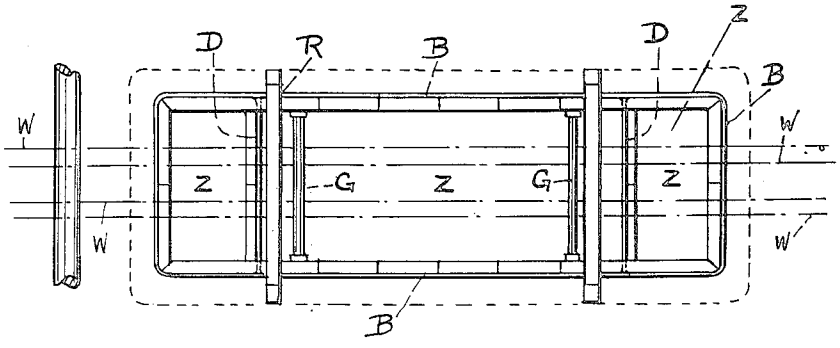
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— FIG. 1 —



— FIG. 2 —



Witnesses.

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NICHOLAS KING TURNBULL, OF MANCHESTER, ENGLAND.

GALVANIZING-BATH.

1,151,629. Specification of Letters Patent. Patented Aug. 31, 1915.

Application filed February 17, 1915. Serial No. 8,891.

To all whom it may concern:

Be it known that I, NICHOLAS KING TURNBULL, a subject of the King of Great Britain, residing at 3 York street, Manchester, in the county of Lancaster, England, have invented new and useful Improvements in Galvanizing-Baths, of which the following is a specification.

This invention has for its object means for insuring that wire, strips, sheets or like objects may be galvanized without passing through an accumulation of impure spelter or dross, and is adapted for use in baths where zinc is superimposed on a metal of higher specific gravity, such as lead.

Baths containing only molten zinc are in general use, even though it is recognized that excessive losses take place due to the formation of hard spelter or dross (by contact of molten zinc and iron) produced by the more or less rapid deterioration of the bath and of the guides, forks and rollers therein, and by the material itself being wholly in contact with molten zinc during its entire passage through the bath.

It has been recognized that the combined use of lead and zinc offers a means of reducing the formation of impure spelter or dross, but the methods hitherto adopted have had serious drawbacks, as only a comparatively thin layer of spelter of uniform depth has been superimposed on lead, the material to be galvanized in some cases entering the bath through lead only, and in others through spelter and then into the lead, but in all cases necessarily being finished through spelter. In all these cases the actual time in zinc has been greatly reduced over ordinary practice, with a consequent reduction in the formation of dross, but such dross as has been made from the material itself, is made and necessarily accumulates at the very worst place, viz: at the exit end, and in the path of the material; and the trouble as a rule has been intensified by the use of iron guides or boxes at the same place, while no provision has been, or could be made for getting such dross as is formed, even by the material alone, away out of the path of the material being galvanized. In some of these cases it seems to be assumed that dross is only made from the bath sides, and none from the material going through. The placing of one bath of a more or less semi-circular section in a larger bath of similar shape, to form two compartments, has been suggested, between the baths being filled with lead, the inner bath being filled with spelter, with a layer of spelter above the same extending more or less to the sides of the exterior bath, it being contended that the dross formed between the baths would automatically fall into the smaller bath. This, however, is impossible; dross would be formed from the sides of the baths, and from the material being galvanized, and as formed would fall vertically down and accumulate in the outgoing path of the material being galvanized, to an extent that would prove troublesome and detrimental and leave the coating not equal in quality to the product from an all zinc bath.

Now the present invention differs from these and any known efforts by heating the spelter solely through the lead, and in insuring that while the material being galvanized passes through a very limited path of spelter it still enters and finishes through spelter having a substantial depth. This is a matter of prime importance, as only with a fair depth of zinc is the purity of the top layer of spelter secured, and at the same time the material passes preferably at an angle over the end chambers containing a fair depth of zinc, and close to the partitions into and out of the central lead chamber, in such manner that the impure spelter formed falls vertically and is collected in said chambers, below the path of and away from the material being galvanized. These end and specially arranged chambers or receptacles at the ingoing and outgoing ends, have sufficient capacity to receive any desired quantity of dross, so as to enable the work to proceed for a considerable time, such as a week, without interruption.

To enable the invention to be thoroughly understood, reference is made to the accompanying drawings, in which—

Figure 1 represents a sectional elevation of a bath embodying the features herein set forth, and Fig. 2 is a plan of the bath shown in Fig. 1.

The bath B is made in accordance with known practice, but has two dividing partitions D of desired depth, welded or otherwise secured to the sides and bottom of bath B, forming three compartments in the bath.

The center compartment is filled with lead L to the height of said partition D, and the two outer compartments also with lead to a lesser depth. Zinc Z is provided

over the whole surface of the bath above the respective levels of the lead.

The formation of hard spelter from the metal of the bath may be obviated by lining and heating the same in the manner shown, such as by making said lining of firebrick at the sides adjacent to the zinc, the zinc being entirely heated through molten lead.

Rollers G or other guiding means, are provided in the lead for the material passing through the bath, and the entering material (say for example wires W) is directed at an angle, and close to the entering partition, so that any impure zinc formed falls to the lowest depth of zinc available (due to its greater specific gravity); such impure zinc, which ultimately forms hard spelter or dross, being collected away from the path of the material being galvanized. The material W then passes through the central lead portion of the bath, and then close to the partition through the finishing layer of zinc at the outgoing end of the bath. It will be obvious that owing to the forward movement of the material, impure zinc cannot accumulate at the portion where the material enters the final layer of zinc, but such impure zinc will be continuously directed in such a manner as will effectually insure the same falling in the greater depth of zinc in the outer finishing compartment.

An additional division or barrier R is preferably also inserted wholly or partially across the bath in the upper layer of zinc, to provide a restricted passage at the point where the material being galvanized passes the division of last compartment, to prevent any dross that may be floating on the highest level of lead from getting into the path of the material being galvanized, and with the object of still further insuring that no impure spelter or dross may accumulate in the path of the material. Such a division also may be inserted in a corresponding position at the entering end, as shown.

The invention is also applicable to baths for galvanizing other articles, say for example sheets, strips, nettings, tubes, or other material that can be passed continuously through the bath, the arrangement being such that the baths can be worked for any convenient period due to this invention providing effective means for continuously diverting the impure spelter from the path of the material being galvanized, thus insuring a covering of the purest spelter thereon.

I claim:—

1. In baths for galvanizing with zinc superposed on a heavier metal such as lead, and where the zinc is wholly heated through the lead: in combination, an outer casing for the metal; dividing members separating the interior of said casing into three compartments, said members being secured to the bottom and sides of said casing, and extending from the bottom to a level short of the top thereof; the inner of said compartments being filled with metal such as lead, and the outer or end compartments containing such metal to a lesser depth; molten zinc being superposed on the lead; and means for guiding the article to be galvanized through the bath, above the outer and into and out of the inner of said compartments, close to the dividing members, for the purpose and substantially as herein set forth.

2. In baths for galvanizing with zinc superposed on a heavier metal such as lead, and where the zinc is wholly heated through the lead; in combination, an outer casing for the metal; dividing members separating the interior of said casing into three compartments, said members being secured to the bottom and sides of said casing, and extending from the bottom to a level short of the top thereof; the inner of said compartments being filled with metal such as lead, and the outer or end compartments containing such metal to a lesser depth, molten zinc being superposed on the lead; an upper barrier adjacent to one of said dividing members and extending across said casing at the upper portion only; and means for guiding the article to be galvanized, through the bath, above the outer of said compartments, and between said barrier and its adjacent dividing member, and into and out of the inner of said compartments, close to said dividing members, for the purpose and substantially as herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

NICHOLAS KING TURNBULL.

Witnesses:

GEORGE FREDERICK GADD,

ARTHUR GADD.