(No Model.) 3 Sheets—Sheet 1.

G. W. JAQUES.

APPARATUS FOR COATING SHEET METAL.

No. 506,044. Patented Oct. 3, 1893.

FIG. I.

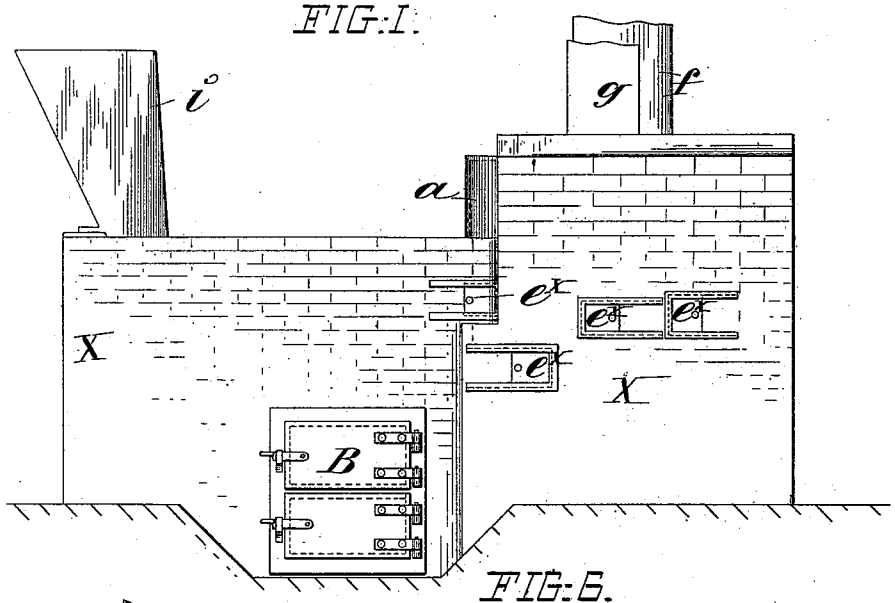
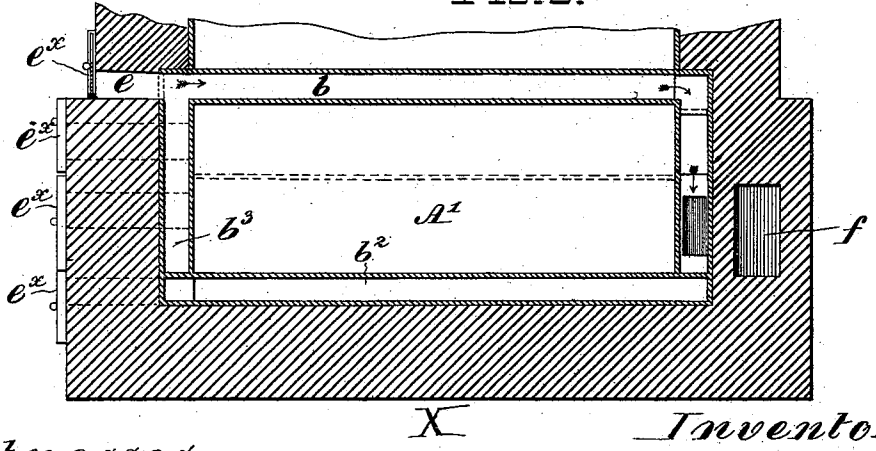


FIG. 6.



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(No Model.) 3 Sheets—Sheet 2.

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APPARATUS FOR COATING SHEET METAL.

No. 506,044. Patented Oct. 3, 1893.

FIG: 2.

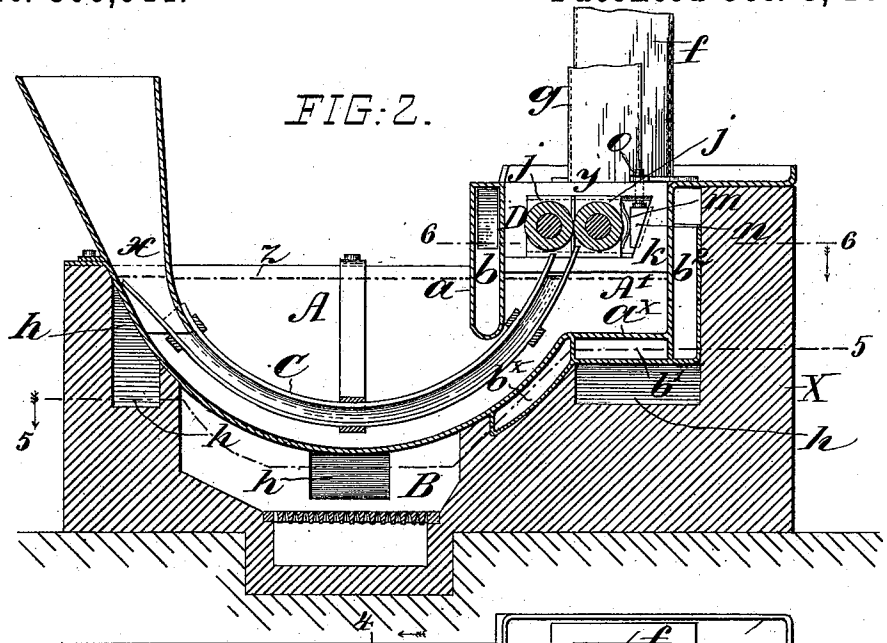
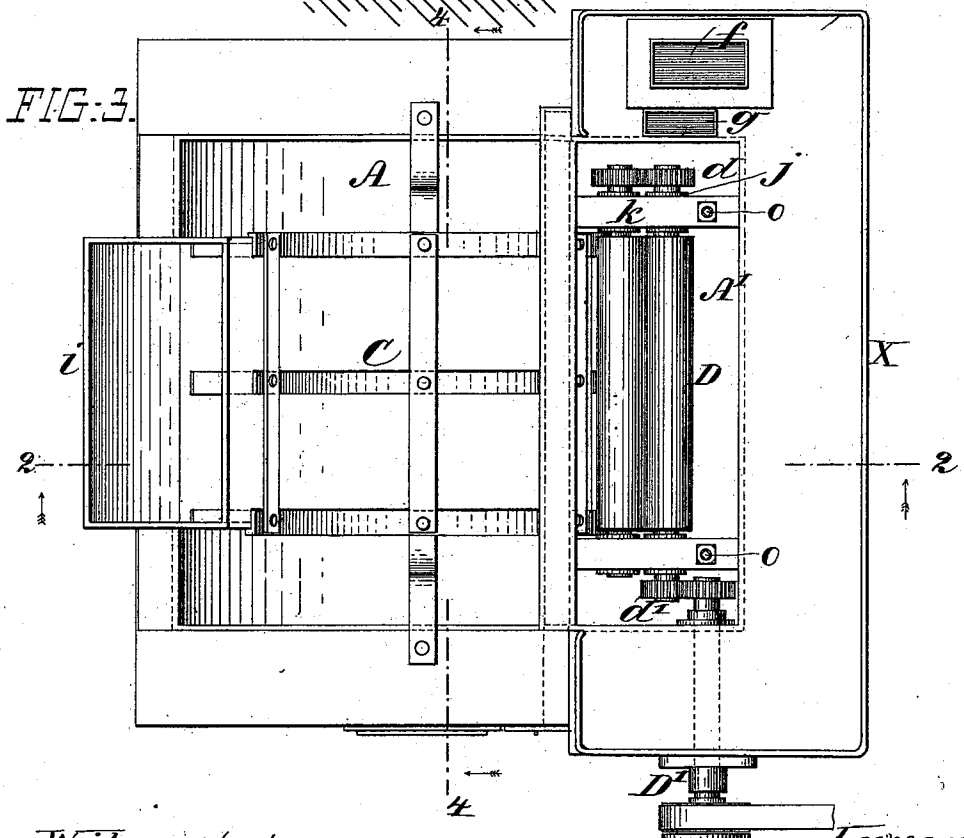


FIG: 3.



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(No Model.) 3 Sheets—Sheet 3.

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APPARATUS FOR COATING SHEET METAL.

No. 506,044. Patented Oct. 3, 1893.

FIG: 4.

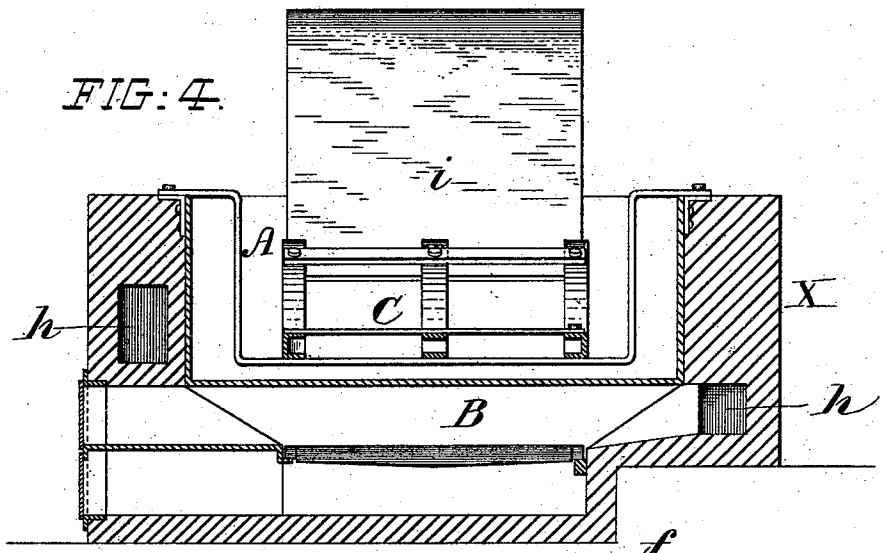
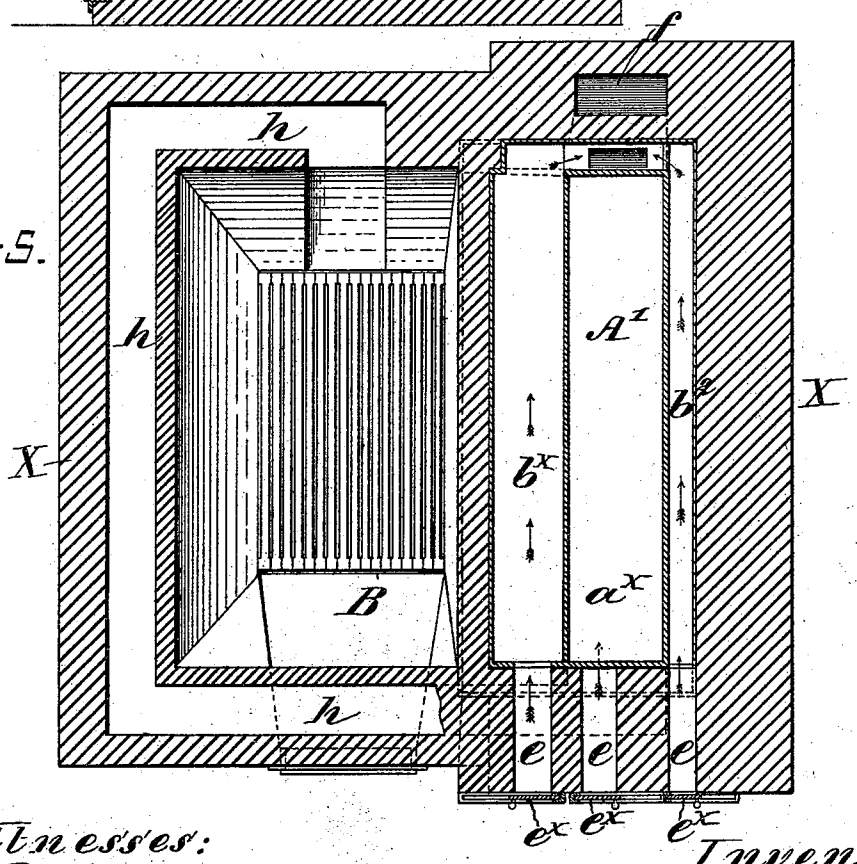


FIG: 5.



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UNITED STATES PATENT OFFICE.

GEORGE W. JAQUES, OF NEW YORK, N. Y.

APPARATUS FOR COATING SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 506,044, dated October 3, 1893.

Application filed June 1, 1893. Serial No. 476,293. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. JAQUES, a citizen of the United States, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Apparatuses for Coating Sheet Metal, of which the following is a specification.

This invention relates to the class of tinning and galvanizing apparatuses, and especially to the kind employed for coating tin and terne plates.

The object of the invention is, in part, to attain two temperatures at the bath with one fire; in part to provide simple means for regulating the temperature of that portion of the bath where the molten metal is covered with oil, and in part to provide a construction of the bath which will enable the minimum amount of molten metal to be used.

The invention will be fully described hereinafter and its novel features carefully defined in the claims.

In the accompanying drawings, which serve to illustrate an embodiment of my invention as applied to an apparatus for coating tin and terne plates—Figure 1 is a side elevation of the apparatus. Fig. 2 is a vertical section of the same in the plane indicated by line 2, 2, in Fig. 3. Fig. 3 is a plan of the apparatus. Fig. 4 is a transverse vertical section, taken in the plane indicated by line 4, 4, in Fig. 3. Fig. 5 is a horizontal section in substantially the plane indicated by line 5, 5, in Fig. 2. Fig. 6 is a horizontal section on line 6, 6, in Fig. 2 showing the arrangement of the air flues.

Before describing the apparatus illustrated in the drawings, it may be said that with the apparatuses heretofore employed certain difficulties have been encountered in the manufacture of tin plate, and so far it has not been found practicable to finish a tin plate, complete, with one pot and one furnace. One important difficulty arises from the fact that the continued passage of the plates first through the bath of metal and then through the grease pot at the delivery end, causes the temperature to rise at the grease pot while it falls at the receiving end of the apparatus; the result is that the oil ignites and a destructive fire results. Attempts have been made to overcome this difficulty by using two fires, but this adds to the expense of the operation and is not wholly effective owing to the difficulty of regulating the fires. Attempts have also been made to keep down the temperature of the oil in the grease pot by passing currents of air about the grease, but this is ineffective as it does not affect the temperature of the metal under the grease. According to the present invention the excessive rise of temperature in the metal under the oil at the delivery end of the pot is prevented and the danger from fire almost entirely eliminated. Only one furnace or fire is required, whereby economy and ease of regulation are attained, and a tin plate may be finished without previous or subsequent treatment.

The above explanation will aid in understanding the following description of the apparatus.

Referring to Fig. 2, especially, X represents the brick work supporting the bath and in which is built the single furnace and the flues therefor. A, is the main portion of the bath, and B the furnace under the same for heating it. The sheets are fed in at the left-hand end, and delivered at the right-hand end as the apparatus is represented in this figure. The bath has a curved bottom, as shown, and in it are arranged the curved guides C, for the metal sheet on its way through the bath from the point, x, of insertion to the point y, where it emerges and is drawn out by suitable delivery rollers, D. These rollers are geared together by toothed gear wheels, d, and are driven from a shaft D′, through the medium of gear wheels d'. This mechanism is best seen in Fig. 3. At the delivery end of the bath there is an inclosure A′, the side a of which dips down into the metal in the bath, thus cutting off from the main bath a space or portion at the delivery point, within which inclosure the oil rests on the molten metal of the bath. The portion A of the bath is usually called the pot, and the portion A′, or that part of the pot at the delivery end where the oil floats on the metal, is sometimes called the grease pot. The broken line z, in Fig. 2 indicates the normal or preferred level of the metal in the bath; the oil level will be at, or a little above the axes of the rollers D. These levels are, however, subject to variation, depending somewhat on the work to be done. This in-

carceration of the oil in an inclosed part of the bath or in the grease pot is not new, broadly speaking, but I provide means for carefully regulating the temperature of this portion of the bath so that with ordinary care the temperature cannot rise therein high enough to ignite the supernatant oil. This difficulty of a rise in temperature igniting the oil and causing a conflagration is one to which these tinning apparatuses, as heretofore constructed, are very liable, and so far as I am aware no adequate means have been provided for overcoming it. Separate furnaces have been employed, as before stated a separate fire being kept up under the delivery end of the bath; but this has not proved satisfactory as the fire is not adapted to be controlled within narrow limits, nor the temperature varied quickly and nicely.

I control the temperature within the grease pot A′, and maintain it lower therein than in the main portion A, of the bath, while employing but one fire or furnace, by the means I will now describe.

The walls and bottom of the inclosure A′, which will usually be of metal, are made double so as to leave flues or flue-like passages or spaces around the oil and molten metal inclosed, through which flues air may be caused to circulate by means of a blower or by natural draft. As herein shown there are four separate flues, b, $b^{\times}$, b' and b^2; the flue b is in the front wall a, the flue $b^{\times}$ is under the curved portion of the bottom of the bath, the flue b' is under the flat portion, or shelf, $a^{\times}$, of the bottom of the inclosure A′, and the flue b^2 is at the back of the bath, in the wall opposite to the front wall a. The air enters these flues at openings e in the side wall seen best in Figs. 1 and 5, and these openings are controlled by register slides $e^{\times}$, of some approved kind. After circulating through these cooling flues, the air enters either the flue in the chimney f, or into a separate chimney or uptake, g. The latter arrangement is shown herein. The front flue b and back flue b^2, are connected by a cross flue, or hollow, b^3, seen in Fig. 6, and at the opposite side, where the uptake g is situated, the several flues b, $b^{\times}$, b' and b^2, open into a cross flue or hollow, b^4, which forms the enlarged base of the uptake g. This connection of the flues with the uptake or chimney flue may be effected by the builder in any convenient manner known to the trade; the particular mode is not important. The air may be forced or blown through the cooling flues by an ordinary blower, but this is a common construction and will require no illustration. It will be understood by inspection that the air may be allowed to flow through any one or more of the several cooling flues, and the volume of air may be regulated by the register slides. Thus the temperature of the metal and oil within the inclosure A′ may be nicely and quickly regulated and varied, but it will be, normally, below the temperature of the main portion of the bath. Without this arrangement for keeping down the temperature of the metal under the oil, the metal,—and consequently the oil—would become gradually hotter from the passage of the hot plates.

In order to heat the bath properly from one furnace, the products of combustion are made to circulate through a flue, h, on their way to the chimney f. Portions of this circuitous flue pass under the receiving and delivery ends of the apparatus.

I do not limit myself to any particular arrangement of the furnace flues so long as they are adapted to attain the end sought.

At the receiving end of the apparatus is a hopper, i, to contain flux or oil which rests on the molten metal at this part of the bath. The hopper i may, if desired, be provided with a double wall and air cooling flues like or similar to those at the delivery end of the apparatus, and for the same purpose, but I have not found such flues necessary at the receiving end.

In order to provide an elastic pressure of the rollers D on the sheet to be drawn from the bath, these rollers (see Fig. 2) have their journals rotatively mounted in blocks, j, mounted to slide in cross-bearers, k, in the inclosed portion of the bath, and back to the blocks j, in which one roller is mounted, are arranged a spring, m, and wedge, n. The spring is arranged between the block and wedge, and the wedge bearing on an inclined face in the aperture in the cross-bearer. A screw o, in the cross-bearer serves to drive the wedge down and thus forces the rollers together through the intermediary of the spring. There will be a device of this kind at each end of the roller.

It will be noted that the hollow walls about the inclosed portion A′ of the bath serve to retain the oil which rests on the top of the molten metal in the bath and of course, being of less specific gravity, it floats on and rises above the general level of the metal in the bath.

Having thus described my invention, I claim—

1. An apparatus for coating sheet metals comprising a horizontally elongated bath for the molten metal having an inclosed portion or grease pot at the delivery end of the same, the bottom of which is at a higher level than that of the main portion of the bath a single furnace arranged under the said main portion only of the bath, said grease pot being separated from the main portion by a hollow partition which extends down substantially to the bottom of the grease pot, as set forth.

2. An apparatus for coating sheet metals comprising a bath for the molten metal having an inclosed portion or grease pot at its delivery end, said grease pot having an elevated bottom, an air flue under said bottom, and an air flue in the partition which separates the grease pot from the main bath, and

a single furnace arranged under the main bath only, substantially as set forth.

3. An apparatus for coating sheet metals, comprising a main bath having a grease pot partitioned off at its delivery end, the bottom of said grease pot being at a higher level than that of the main bath, a single furnace situated under the main bath only and having a flue which extends under the bottom of the grease pot, and an air flue b', under the bottom of the grease pot and over said furnace flue, substantially as set forth.

4. An apparatus for coating sheet metals, comprising a main bath for the molten metal, a grease pot at the delivery end of the said bath, said grease pot being of less depth than the main bath and having a substantially level bottom, air flues arranged at the sides and beneath the said grease pot, means for causing a circulation of air through said flues and for regulating said circulation, and a single furnace for heating the bath, substantially as set forth.

5. In an apparatus for coating sheet metals, the combination with the main bath A, of the grease pot A′, of less depth than the main bath, situated at the delivery end of the bath, the grease pot having air flues b, $b^{\times}$, b' and b^2, about it, the flues b and b^2 extending down to the bottom of the pot, means for causing a circulation of air through said flues and for regulating said circulation, and a single heating furnace arranged under the main bath only, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

GEORGE W. JAQUES.

Witnesses:
HENRY CONNETT,
PETER A. ROSS.