

## UNITED STATES PATENT OFFICE.

JAMES R. PHILLIPS AND CHARLES W. BRAY, OF PITTSBURG, PENNSYLVANIA, ASSIGNORS TO THE AMERICAN TIN PLATE COMPANY, OF ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## METHOD OF ROLLING BLACK PLATES OR SHEETS.

SPECIFICATION forming part of Letters Patent No. 740,176, dated September 29, 1903.

Application filed December 23, 1901. Serial No. 36,932. (No model.)

*To all whom it may concern:*

Be it known that we, JAMES R. PHILLIPS and CHARLES W. BRAY, of Pittsburg, Allegheny county, Pennsylvania, have invented a new and useful Method of Rolling Black Plates or Sheets, of which the following is a full, clear, and exact description.

Our invention relates to the rolling of thin sheets or plates from bars, and especially the rolling of black sheets for tinning; and its object is to prevent sticking of the sheets of a pack together and do away with the numerous heatings and opening of the packs heretofore necessary. In the method now used for producing such sheets four heatings and two doublings have been necessary in reducing sheet-bars to sheets of the desired gage. It has heretofore been found impracticable to continue the rolling of a pack beyond a certain amount, for the reason that if continued beyond this limit the different layers of the pack will stick together. Consequently the rolling must be stopped, the sheets opened, the packs re-formed and reheated, and the rolling then continued.

Our invention consists in coating the plates or sheets of a pack with copper by dipping them in a sulfate-of-copper solution and then making a pack of the coated plates and rolling to the desired gage.

It further consists in the combinations of steps, as hereinafter more fully described, and set forth in the claims.

In carrying out our process in its preferred form we use sheet-bars of about one-sixteenth of an inch in thickness in place of the ordinary bars, which are from three-eighths of an inch to one-half inch thick, though the regular bars may be used, if desired. These sheet-bars are of a width suitable to make a sheet of the width desired and of such a length as to make sheets of the desired thickness when rolled to the proper length. These sheet bars or plates are coated with copper by passing them through a solution of sulfate of copper. They are then heated in the usual manner, formed into a pack of six or eight or any desired number, and this pack is rolled until

the desired gage of sheets is obtained. We may pickle the bars in a dilute solution of sulfuric or other acid in order to remove the scale before subjecting them to the coating solution, the plates then being washed before they are coated. This would tend to give a more even distribution of the coating over the plate; but we have not found the step of pickling to be necessary, having carried out the operation by merely subjecting plates to the sulfate-of-copper solution and then heating and rolling them in the pack.

In operating our process the plates may be piled or matched upon each other to form a pack after heating; but for convenience in keeping the plates together in the furnace we preferably pile three or more of the plates upon each other after coating them and then double this pack before heating. This doubling binds the plates closely together, so that they will remain as a compact pack in the furnace and will also keep them in proper position for handling during rolling.

The process may be further varied by coating the plates, heating them, forming a pack of three or more of the heated plates or bars, and then doubling the pack and rolling it to the desired gage. The sulfate-of-copper solution which we have used has been from thirty to fifty per cent. solution; but a weaker or stronger solution might be used, and we do not wish to limit ourselves to any particular strength or percentage in the coating-bath.

The advantages of our invention result from the great reduction in the amount of labor and time required in rolling plates into sheets. The bars or plates may be reduced to the desired gage for tin plates or otherwise at a single heat without opening the pack and reheating. The coating in this particular bath is found to effectually prevent sticking of the plates or sheets together and does not interfere with the tinning operation to which the sheets are afterward subjected. The coating may be applied by electrodeposition or otherwise, and many variations may be made in the apparatus used and the succession of steps without departing from our invention, since



we consider ourselves the first to coat plates or bars with copper before forming a pack and rolling.

We claim—

- 5 1. The method of rolling sheets or plates, consisting in coating bars or plates with copper, forming a pack of the coated plates and rolling them to the desired gage; substantially as described.
- 10 2. The method of rolling sheets or plates, consisting in coating plates with a sulfate-of-copper solution, forming a pack of said plates, and then heating and rolling the pack to the desired gage; substantially as described.
- 15 3. The method of rolling black plates or

sheets, consisting in pickling said plates, coating them with a solution of sulfate of copper, forming a pack and heating and rolling the pack to the desired gage; substantially as described.

In testimony whereof we have hereunto set our hands.

JAMES R. PHILLIPS.  
C. W. BRAY.

Witnesses as to James R. Phillips:

W. T. GRAHAM,  
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Witnesses as to Charles W. Bray:

C. P. EYRNES,  
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