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PROCESS OF MANUFACTURE OF PLATES AND LARGE SHEETS OF COMPOSITE OR COMPOUND METAL.

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1,332,674. Patented Mar. 2, 1920.

Fig. 1.

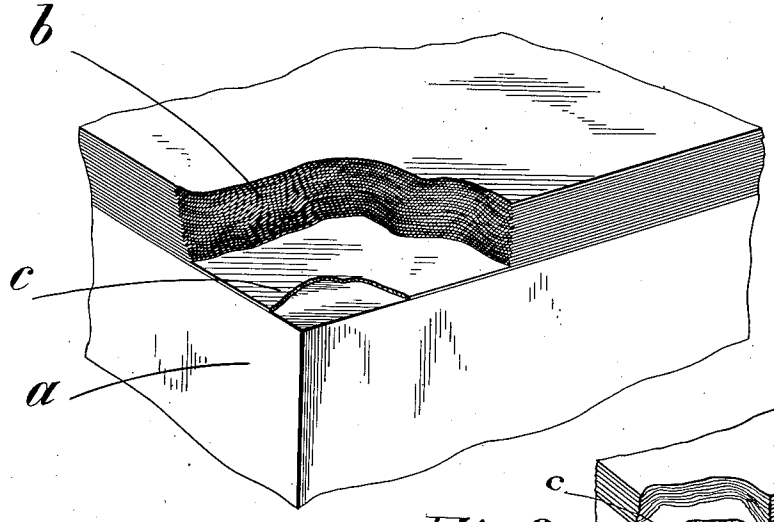


Fig. 3.

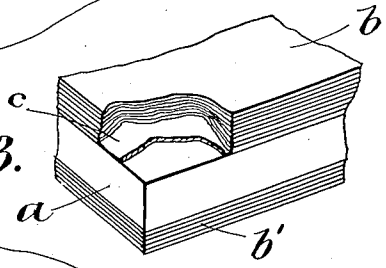
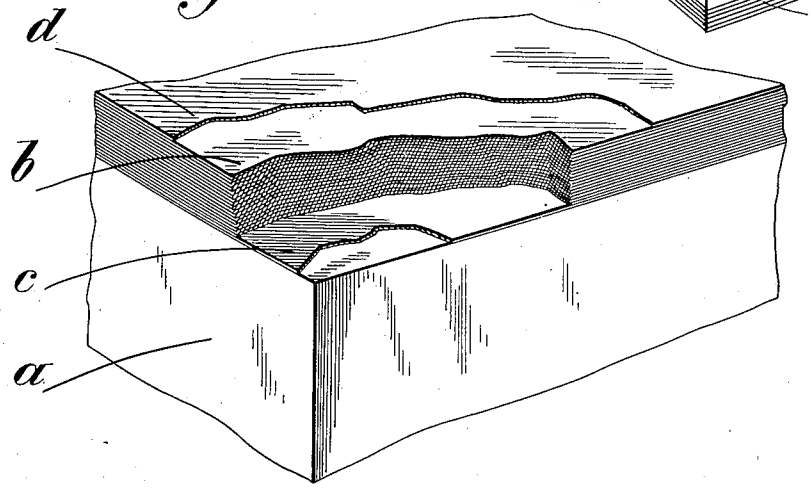


Fig. 2.



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EDOUARD MARTIN, OF BRUSSELS, BELGIUM, ASSIGNOR TO COMPAGNIE BELGE DU BI-METAL, SOCIETE ANONYME, OF BRUSSELS, BELGIUM, A CORPORATION OF BELGIUM.

PROCESS OF MANUFACTURE OF PLATES AND LARGE SHEETS OF COMPOSITE OR COMPOUND METAL.

1,332,674. Specification of Letters Patent. Patented Mar. 2, 1920.

Application filed February 13, 1919. Serial No. 276,829.

To all whom it may concern:

Be it known that I, EDOUARD MARTIN, a citizen of the French Republic, residing at Abbaye de Forest, Brussels, in the Kingdom of Belgium, have invented certain new and useful Improvements in Processes of Manufacture of Plates and Large Sheets of Composite or Compound Metal, of which the following is a specification.

This invention has for its object the manufacture of plates and large sheets composed of composite or compound metal by the rolling out of thick ingots or blocks (of from 100 to 250 mm. in thickness and more) of composite or compound metal such as steel and copper, steel and brass, etc., while preserving the initial proportions of these two metals.

This manufacture has not been capable of being carried out hitherto because the known processes did not permit of obtaining thick ingots of composite or compound metal capable of being rolled regularly. Indeed if a comparatively thick plate of copper or brass be coated on to one or each of the faces of a thick ingot of steel, covered as usual with a galvanic deposit of copper or other suitable metal or alloy, it is found, after heating and passing through the hydraulic press, that the copper or brass gives way and projects beyond the steel, thus destroying the initial proportion of the two metals and, if the ingot is afterward passed through the rolling mill, the copper or the brass projects still more and there is even produced a complete separation of the two metals.

To avoid these disadvantages, attempts have been made to employ the copper or the brass, for the formation of the ingots, in the form of superposed sheets, each of about $\frac{1}{2}$ mm. in thickness. By this means attempts have been made to roll ingots up to about 50 to 60 mm. in thickness but it has not been possible to obtain regularly a sufficient adhesion of the copper or the brass with the steel and this method of manufacture has not been able to be generalized. It is, however, by continuing on these lines, that the present method has been arrived at which consists broadly in subdividing the plate of copper or of brass into sheets of such thinness that by superposing them a supple metallic block is obtained. The thinner these sheets are the more regularly does the rolling take place without projection of the copper or the brass in the hydraulic press or during rolling. If it be desired for example, to roll a block of steel of 200 mm. in thickness in order to make therefrom a compound metal with 6 per cent. of copper on each face, use will be made of this latter in the form of supple blocks each formed of 120 sheets $\frac{1}{10}$ of a mm. thick for example. By virtue of its supleness, the block of copper remains continually in contact with the block of steel, it adapts itself to all the undulations which this latter undergoes and follows all its movements during the course of the rolling and thus avoids separation and slipping. Furthermore, by the subdivision of the block of copper into very thin sheets it is possible to obtain a much more perfect homogeneity of the mass and entirely to avoid bubbles or other defects which, in rolling, would prevent continuous adhesion to the steel.

On the other hand, it has been found that the adhesion of the copper to the steel is greatly favored when the part of the supple block which is put into contact with the steel is composed of sheets which are themselves formed of a special compound metal one face of which is formed of copper and the other face "of brass the latter coming in contact with the steel". This brass acts as a brazing on the steel while the copper is intended for the soldering to the other sheets of the supple block.

The division into sheets of the block of copper or brass also offers the advantage that it is possible to modify the color of the compound metal obtained by placing on the outer part of the supple block sheets of compound metal such as copper and brass, copper and tombac, copper and silver, etc.

The accompanying drawing shows the manner of forming composite or compound metal ingots or blocks according to this invention.

In Figures 1 and 2, *a* is the steel ingot, *b* the superposed sheets of copper or other covering metal or alloy and *c* the sheet of compound metal placed between the steel and the covering metal or alloy.

In Fig. 2, *d* are sheets of compound metal placed on the outer part of the covering metal or alloy *b*.

Fig. 3 is a view of an ingot having sheets of metal b, b', applied to both sides thereof.

The manufacture of plates and large sheets according to the present method is conducted in the well known way by cutting out to the dimensions of the steel ingot the metal sheets constituting the supple blocks which are placed on one face or the two faces of the ingot previously covered with a galvanic deposit of copper or other suitable metal or alloy. The whole is then clamped between suitable counter plates heated to a temperature of from 800° to 1000° C. and then passed to the hydraulic press on issuing from which the brass has become soldered to the steel. The bimetallic ingot thus formed is then ready to be rolled. After rolling it is found that the steel and the copper or the brass have undergone a uniform elongation and that a perfect adhesion has been produced between the two metals.

What I claim and desire to secure by Letters Patent of the United States is:—

1. Process of manufacture of plates and large sheets of composite or compound metal by the forming and rolling of thick ingots or blocks of composite or compound metals such as steel and copper, steel and brass, etc., characterized by the fact that the covering metal is employed in the form of blocks of sheets so thin that they form supple metal blocks which are placed on one or both sides of the steel ingot, the whole being then heated and passed to the hydraulic press, in the well known way, before being rolled.

2. Process according to claim 1, characterized by the fact that sheets of composite metal are interposed between the steel ingot and the sheets of covering metal or alloy for the purpose of favoring the adhesion of these to the steel.

3. Process according to claim 2, characterized by the fact that sheets of composite metal of suitable composition are placed on the outside of the packs of sheets of covering metal in order to obtain different colors of the surface of the sheets and plates produced.

In testimony whereof I have affixed my signature in presence of two witnesses.

EDOUARD MARTIN.

Witnesses:

B. W. KIRKPATRICK,

F. Y. ZABARL.