

# UNITED STATES PATENT OFFICE.

LUDWIG MOND, OF LONDON, ENGLAND.

## PROCESS OF DEPOSITING NICKEL.

SPECIFICATION forming part of Letters Patent No. 455,230, dated June 30, 1891.

Application filed November 11, 1890. Serial No. 371,099. (No specimens.)

*To all whom it may concern:*

Be it known that I, LUDWIG MOND, manufacturing chemist, a subject of the Queen of Great Britain, of Regent's Park, London, in the county of Middlesex, in the Kingdom of England, have invented a certain new and useful Improvement in Making Sheets, Stereotypes, Casts, and Coatings of Nickel, of which the following is a specification.

10 This invention relates to a process for plating or coating all kinds of goods metallic and non-metallic, capable of standing a moderate heat, with a compact coating of nickel by means of a compound of nickel with carbon monoxide, called "nickel-carbon oxide." 15 This nickel-carbon oxide is a liquid boiling at 43° centigrade, soluble in a large number of organic compounds, such as benzole and petroleum, and readily volatile at ordinary 20 temperature in a current of other gases which have no chemical action on it, such as carbon monoxide, carbon dioxide, hydrogen, and nitrogen.

The nickel-carbon oxide and the method of 25 preparing the same have heretofore been made public by me, and are generally understood by those skilled in the art. A method of producing the same by exposing an oxide of nickel to the reducing action of carbon 30 monoxide, hydrogen, or a hydrocarbon at a temperature of about 350° to 400° centigrade, cooling the reduced oxide below 150° centigrade, and treating it with carbon monoxide, is fully described in two applications for Letters Patent of the United States filed November 6, 1890, Serial Nos. 371,096 and 371,098, and patented of even date herewith.

To carry out my invention I heat the goods 40 to be coated to a suitable temperature and expose them to the vapor of the nickel-carbon oxide, preferably diluted with nitrogen and hydrogen, as in "water-gas," or I immerse the heated goods in the liquid nickel-carbon oxide or a solution of this compound. 45 The goods should have a clean metal surface or be coated with graphite or other suitable material. In this way nickel plating, obtaining casts similar to nickel electroplates, and the manufacture of thin sheet-nickel or tubes

can be carried on. To effect this, bright metallic or suitably coated surfaces or goods are 50 heated to 180° centigrade or more, and exposed to the vapor of the nickel-carbon oxide, (preferably diluted with an inert gas,) or the heated goods are brought into contact with 55 the liquid nickel-carbon oxide or a solution of this compound by immersion or otherwise. The solution is effected by adding the nickel carbon oxide to benzole, petroleum, or other solvent. The nickel commences to deposit 60 upon the goods immersed in the liquid or its solution at a temperature of 60° to 70° centigrade, and in the vapor at about 150° centigrade; but the exact temperature to which the goods have to be heated depends upon 65 the thickness, color, and nature of the coating which it is desired to obtain, and also upon the character and size of the goods to be coated, and has to be ascertained and varied according to experience. 70

In forming sheets of nickel, plane or gently curved surfaces coated with graphite or other suitable substance are employed on which to deposit the nickel, and for tubes, rods or cores of any suitable material preferably 75 coated with graphite can be employed.

I declare that what I claim is—

1. The process of nickel-plating, which consists in heating the article to be plated, and bringing it in contact with nickel-carbon 80 oxide.

2. The process of obtaining stereotypes, casts, or copies of engraved surfaces or patterns in relief, which consists in exposing the surface to be copied in a heated condition to 85 nickel-carbon oxide, and separating the nickel coating from the matrix.

3. The process of obtaining sheet-nickel, which consists in exposing a heated surface to nickel-carbon oxide, and separating the 90 nickel from the said surface.

4. The process of obtaining a nickel tube, which consists in exposing a suitable core coated with graphite or other suitable substance in a heated state to nickel-carbon oxide 95 and extracting the nickel tube formed from the core.

5. The process of depositing nickel upon a

surface by bringing the heated surface in contact with the solution of nickel-carbon oxide.

6. In the process of depositing nickel upon a surface, the step consisting in bringing the  
5 heated surface in contact with a mixture of nickel-carbon oxide with inert gases, such as nitrogen and hydrogen.

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

LUDWIG MOND.

Witnesses:

WM. P. THOMPSON,  
JOHN HAYES.