

# UNITED STATES PATENT OFFICE.

WILHELM BOEHM, OF BERLIN, GERMANY.

PROCESS OF MANUFACTURING CONTACT-PIECES BETWEEN FIRST AND SECOND CLASS CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 695,600, dated March 18, 1902.

Application filed February 26, 1900. Serial No. 6,561. (No specimens.)

*To all whom it may concern:*

Be it known that I, WILHELM BOEHM, chemist, a subject of the German Emperor, residing at 74 Rathenowerstrasse, in the city of Berlin, Kingdom of Prussia, and German Empire, have invented a certain new and useful Process of Obtaining a Conducting Union Between First and Second Class Conductors, of which the following is a specification.

10 This invention has reference to the manufacture of conducting contact-pieces from suitable first and second class conductors, and it is intended to obviate the difficulties hitherto presented in the obtainment of a durable contact between first and second class conductors. The attempts made heretofore to obtain this object have failed to produce the desired results. Heretofore second-class conductors themselves were used for this purpose, which in some instances were mixed with first-class conductors, so as to arrive at a good conductibility of the contacts. The employment of second-class conductors is in itself not to be regarded as novel, both as such and in solution. Such application of these substances may be easily inferred from their employment as cements in the manufacture of incandescent gas-light, where the supporting platinum wire was attached in this way in the earthy Auer mantle.

30 The processes heretofore in use showed the disadvantage that the contacts produced thereby failed to withstand the extremes of heat and soon became loose or broke or melted away. By my invention I have succeeded to produce contact-pieces of great durability.

40 In carrying out my invention I also use second-class conductors as a base, and particularly those oxids which are employed in the incandescent body itself—such as oxids of magnesium, aluminium, zirconium, thorium, and cerium; but I proceed in this manner: I subject those oxids and their equivalents to a very powerful heat, such as produced by a Fletcher gas-furnace or the like or by means of the electric arc, respectively, the electric furnace. I am thereby enabled to so increase the heat that the originally fritted or molten mass is transformed into the condition of vapors, according to the strength of the heating-current. The mass, which has become condensed by subjecting it to a powerful heat in the

manner just described, is allowed to cool and ground to a fine powder, which by the aid of a suitable organic or inorganic combining agent may be attached at points of connection of the conducting-bodies and is finally dried and burned. By means of this treatment at a most intense heat the molecules of the substance under treatment are brought as close as possible to each other, so that the action goes far beyond a mere fusion, but the porosity of the substance is overcome and the specific gravity of the material is considerably increased. The researches of Moissan have shown the possibility of extending this action of an increase in the specific gravity and a decrease of porosity, which has been known to some extent for oxid of magnesium, to all oxids of metals of the earth and of the alkaline earth groups. By the application of these facts to the manufacture of contact-pieces I am enabled to entirely dispense with the use of first-class conductors in the manufacture of such contacts and to overcome the possibility of a subsequent shrinkage and fusion of the light-giving body, which is most likely to occur at the points of connection.

As proof for the dependence of the quality of the contact upon the degree of heat to which it was previously subjected, I may mention that those oxids which were first fused in the electric furnace were considerably superior in durability to those which were only heated in the oxygen or hydrogen-oxygen blast.

85 Provided the heat is increased so as to cause the vaporization of the oxids subjected to this treatment, it is possible to entirely avoid the tedious grinding of the masses, fritted or molten by previous heating, it being only necessary to collect the vapors. The powder thus obtained may be first purified by any suitable means and is then made into contact-pieces of any form desired, which may be in the form of a paste or cement or in the form of small rods or tubes or assume any other suitable shape. In applying these they are preferably placed over the ends of the incandescent bodies and of the conductors. The joints produced by the cementing or the insertion of tubes may be further strengthened by heating them in the electric arc, thus producing fusion between the incandescent heating or resistance body and



the cement or conductor. By this means the possibility of melting contacts will be entirely eliminated. For currents of but lower intensity the fritting or melting of the substances will be found sufficient for the formation of a suitable cement, while higher intensities will generally require the use of the vaporized product.

It is understood that in employing second-class conductors I may use oxids, as well as suitable salts—such as the wolframates, silicates, titanates, or niobates.

It is evident that by my improved process a novel technical effect of great importance is produced.

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

1. A process for producing a conducting union between first and second class conductors by first condensing and overcoming the porosity of second-class conductors serving as contact-pieces by the fritting or melting

action of a powerful heating agent, finely dividing the product after fusion, subsequently forming it into bodies of any desired shape, and inserting such highly-condensed bodies between the joints.

2. A process for producing a conducting union between first and second class conductors by subjecting a material to a melting action of suitable duration by means of a powerful heating agent collecting the vapors produced and forming rods, tubes and other bodies therefrom and finally applying such bodies to the joints, substantially as described.

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

WILHELM BOEHM.

Witnesses:

HENRY HASPER,  
WOLDEMAR HAUPT.