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ALIEN PROPERTY CUSTODIAN

UTENSILS, APPARATUS, APPARATUS PARTS EXPOSED TO ATTACKING GASES

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in the Alien Property Custodian

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My invention relates to improvements in the construction of utensils, apparatus, apparatus parts and the like which may be affected by corroding gases, such as hydrogen, hydro-carbons, hydrogen sulphide or the like, by using beryllium cementated materials.

Hitherto it was known to construct utensils, apparatus and apparatus parts such as, for instance, pressure tight, vessels, tubes and the like which must resist the attack of gases such as hydrogen, hydro-carbons, hydrogen sulphide and the like, especially at high temperatures as well as high pressure, from materials such as iron or steel, cementated with other metals, such as aluminium and the like. Now it was found that, especially, through the influence of heat to which the apparatus are exposed a more or less rapid diffusion of the cementating metals into the iron or steel occurs. Hereby the surfaces which face the corroding gases will be exhausted more and more of the resistant cementation means which consequently leads to a reduction of the resistance against the gases and gas mixtures, attacking the walls of the apparatus and thereby rendering them prematurely useless.

Thorough investigations have shown that these disadvantages may be removed to a considerable extent by using iron, for instance, ingot steel, low or high alloyed steels, such as chromium nickel steels, cementated with beryllium as construction material. Nevertheless it has been observed that hereby also a diffusion of the beryllium into the basic metal takes place. This diffusion, however, stops at a certain not exceedable limit with the use of beryllium as cementation means. This is probably the reason why the resistance of apparatus and apparatus parts made of beryllium cementated material of construction is so much better in consequence, and, against the attacking gases their durability so much longer than by using construction materials cementated with aluminium and the like.

According to my invention the beryllium cementated materials of construction are inter alia excellently suited for the construction of utensils and apparatus for the high pressure reaction, for instance, the production of methyl alco-

hol, hydrogenation under pressure of combustibles and similar processes.

The cementation may be carried out in a very simple manner, for instance, in such a way that the surfaces of the basic metal, if desired roughened, may be coated with a layer of beryllium or provided with a beryllium containing coating, for instance, a beryllium containing lacquer. Thereupon the beryllium is heated to cause its diffusion into the base metal. There is also a possibility to deposit the beryllium by way of electroplating on the base metal and then causing it to diffuse by the influence of heat. Instead of beryllium other compounds of beryllium which are suitable to yield metallic beryllium, for instance, reducible beryllium compounds, may also be deposited on the base, whereupon the beryllium is set free, for instance, by reducing means and then caused to diffuse by heating.

Other metals, such, for example, as copper, nickel, tungsten, titanium, vanadium, aluminium, either alone or together, may also be introduced into the base metal besides the beryllium. Hereby the cementation process may be carried out in such a way that the beryllium or compounds which yield metallic beryllium are deposited in admixture with other metals or those yielding compounds on the base and then submitted to joint cementation. According to my invention, one may proceed, for instance, also in such a way that the cementation begins with the admixed metals, whereupon the beryllium finally will be cementated. At all events care is to be taken that the cementation of beryllium is carried out properly with the purpose of obtaining an increased resistance of the construction material.

Moreover, my invention may be carried into effect by submitting the beryllium cementated construction materials first to an advantageously prolonged heating whereby the beryllium is caused to diffuse up to the aforementioned limit and afterwards cementating a second time with beryllium.

The cementation of iron, steel and the like with beryllium may be carried out according to my co-pending application S. N. 248,647 of 30, 12, 1938.

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