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ALLOY

Cecil Spencer Sivil, Roselle, N. J., assignor to Baker & Company, Inc., Newark, N. J., a corporation of New Jersey

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6 Claims. (Cl. 75-172)

This invention relates to alloys and is concerned in particular with platinum metal alloys.

It is one object of my invention to provide alloys of great corrosion resistance, high melting point and great hardness and strength. It is another object of my invention to provide such alloys of great electrical resistance. It is a further object of my invention to provide such alloys of low specific gravity and low cost.

This application is a continuation in part of my application No. 288,572, filed August 5, 1939.

The alloys according to my invention consist of platinum, palladium and ruthenium. In such alloys according to my invention the platinum content may be as low as 10% and as high as 80%, the palladium content may be as low as 12% and as high as 90% and the ruthenium content may vary from 1%-15%. In more specific embodiments the palladium content of such alloys should not fall below about 15% and the ruthenium content should not exceed about 10%. In its best embodiment the alloys consist entirely of platinum palladium ruthenium in the proportions specified herein, although of course minor quantities of other metals may be present so long as they do not substantially affect the beneficial properties and characteristics of my alloys.

The following table will illustrate the nature and properties of the alloys according to my invention:

Composition			Tensile strength		Elongation, percent on 2"	Density	Melting point
Pt	Pd	Ru	Hard	Annealed			
			Lbs./sq. in.	Lbs./sq. in.		Gr./cc.	° C.
10	87	3	82,500	42,400	29.0	12.6	1,575
20	77	3	83,700	44,200	34.0	13.2	1,595
40	57	3	79,000	50,100	33.0	14.5	1,640
60	37	3	86,200	54,400	33.3	16.4	1,680
70	24	6	103,400	70,700	27.5	17.3	1,700
74	20	6	107,200	72,400	31.5	17.8	1,710
80	14	6	137,000	83,700	30.5	18.9	1,730

In the alloys specified in the above table the electrical resistivity ohms/mil ft. varies from 153 for the alloy of 10% platinum 87% palladium and 3% ruthenium to 220 for the alloy of 60% platinum 37% palladium and 3% ruthenium and from 250 to 235 for the alloy of 70% platinum 24% palladium and 6% ruthenium and the alloy of 80% platinum 14% palladium and 6% ruthenium, respectively.

The alloys according to my invention may be such as to have a relatively high palladium content and such as to have a relatively low palladium content. Thus the alloys may comprise

more particularly for instance alloys of from 60% to 80% platinum, from about 15% to 30% palladium and from 1% to 10% ruthenium, such as alloys of 74% platinum 20% palladium and 6% ruthenium, or of 70% platinum 24% palladium and 6% ruthenium, or even of 80% platinum 14% palladium and 6% ruthenium, or the alloys may comprise more particularly for instance alloys of from 25% to 60% platinum, from 30% to 74% palladium and from 1% to 10% ruthenium such as alloys of 30% platinum 67% palladium and 3% ruthenium, or of 40% platinum 57% palladium and 3% ruthenium. With increasing palladium content the alloys have decreasing specific gravity, increasing tensile strength, increasing electrical resistance and decreasing melting point. All such alloys are surprisingly ductile notwithstanding their high tensile strength and great hardness. The alloys according to my invention are also highly resistant to corrosion. Alloys containing at least about 35% palladium show particularly favorable properties.

The alloys according to my invention are capable of being used advantageously in widely different fields. They may be used in the construction of corrosion resistant apparatus and they may be used in the field of jewelry and the decorative arts. They may be used in the electrical industry for instance as electrical resistance wires, a use more particularly described and claimed in

my co-pending application Serial No. 288,572 filed August 5, 1939. Such alloys may be used in the form of wire, sheet or other manufactured article and may be given intricate shapes and forms due to their great hardness combined with great ductility.

What I claim is:
1. An alloy of ten (10) percent to eighty (80) percent platinum, twelve (12) percent to ninety (90) percent palladium, and one (1) percent to fifteen (15) percent ruthenium.
2. An alloy of sixty (60) percent to eighty (80) percent platinum, fifteen (15) percent to thirty

(30) percent palladium, and one (1) percent to ten (10) percent ruthenium.

3. An alloy of seventy (70) percent to seventy-four (74) percent platinum, twenty (20) percent to twenty-four (24) percent palladium, and about six (6) percent ruthenium.

4. An alloy of twenty-five (25) percent to sixty (60) percent platinum, thirty (30) percent to seventy-four (74) percent palladium, and one (1) percent to ten (10) percent ruthenium.

5. An alloy of thirty (30) percent to forty (40) percent platinum, fifty-seven (57) percent to sixty-seven (67) percent palladium and about three (3) percent ruthenium.

6. An alloy of twenty-five (25) percent to sixty (60) percent platinum, thirty-five (35) percent to seventy-four (74) percent palladium, and one (1) percent to ten (10) percent ruthenium.

CECIL SPENCER SIVIL.