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ALLOY FOR PEN POINTS

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5 Claims

ABSTRACT OF THE DISCLOSURE

An alloy suitable for use in the casting of pen points having up to 50 weight percent of osmium and/or rhenium, 30 to 45 weight percent iridium, 5 to 20 weight percent ruthenium, up to 25 weight percent of a noble metal, and up to 15 weight percent of a base metal of Group 8, such as cobalt.

This is a continuation of application Ser. No. 560,883, filed June 27, 1966, now abandoned, which in turn was a continuation-in-part of application Ser. No. 543,515, filed April 19, 1966, now abandoned.

The present invention relates to an alloy which is especially suitable for producing the tips of pen points.

For this purpose it has been conventional prior to this invention to employ especially alloys which have a high content of osmium or ruthenium aside from other metals of the platinum group and which as alloying constituents also contain varying amounts of base metals, especially tungsten.

Among these alloys, especially those which contain a high percentage of osmium were always preferred for making the tips of pen points because of their particular property of having a high abrasive resistance. However, apart from the high melting point of such osmium alloys which renders the production of well-formed spherical tips for pen points very difficult, they have the further disadvantage of being extremely expensive. Consequently, most consumers prefer to use pen points with tips which are made of cheaper alloys, even though they possess the disadvantages of these materials rather than using pen points the tips of which are made of materials with a high osmium content which have a very high abrasive resistance but are very expensive.

According to the present invention, the surprising discovery has now been made that it is also possible to make the tips of pen points of materials with a lower osmium content which despite their considerably lower cost are equivalent to alloys with a high osmium content, even if the osmium is completely replaced by another metal, namely, rhenium. This result was especially surprising because it was also found that the alloys according to the invention also possess all the other properties which are important in materials for producing the tips of pen points.

The new alloys comprise according to the present invention of up to 50%, preferably 25 to 40%, of osmium, of 20 to 50%, preferably 30 to 45% of iridium, and 5 to 20%, preferably more than 8%, of ruthenium, which alloys are made in the conventional manner of producing alloys for use as the tips of pen points. The osmium content may be replaced partly or entirely by rhenium. These alloys further contain, other than as mentioned, precious metals of the 8th group of the periodic system, namely, platinum, palladium, and/or rhodium. The content of these alloy constituents when employed together should, however, not exceed 25%, while the content in platinum

or palladium alone may amount up to 15% of the entire alloy. The content in rhodium, however, should generally only amount up to 10%. Apart from these precious metals, the alloys according to the invention also contain base metals of the 8th group of the periodic system, that is, either individually or together up to 15%. One very useful addition has been found to consist of cobalt.

The most important property of these alloys is their high abrasive resistance which can otherwise be attained only by alloys with a high percentage of osmium or by the natural osmi-iridium. As compared with these materials which are known for making the tips of pen points, the alloys according to the invention have, however, the considerable advantage of having much lower melting points and of therefore being easily melted, and of also permitting the production of well-shaped spherical tips to be carried out without difficulty. In addition, the new materials have a high compressive strength, a high tenacity, and a fine-grained structure free of pores. The tips which are made of these alloys may be easily welded upon the pen points and, since they may be easily polished, they permit very soft and delicate writing. Their ink resistance fully complies with all requirements even if the osmium is replaced completely by rhenium.

The alloys according to the invention may have, for example, the following composition:

Example 1: 25% Os; 35% Ir; 13% Ru, 10% Pt; 1% Rh; 12% Re; and 4% Co.

Example 2: 35% Os; 40% Ir; 10% Ru; 9% Pt; 3% Rh; and 3% Co.

Example 3: 30% Re; 5% Os; 38% Ir; 12% Ru; 9% Pt; 1% Rh; and 5% Co.

Example 4: 38% Re; 36% Ir; 10% Ru; 10% Pt; 1% Rh; and 5% Co.

Having thus fully disclosed our invention, what we claim is:

1. An alloy useful in the production of ball point pen tips consisting essentially of 25 to 40 weight percent of at least one metal selected from the group consisting of osmium and rhenium, 30 to 45 weight percent iridium, 8 to 20 weight percent ruthenium, 10 to 25 weight percent of at least one noble metal selected from the group consisting of platinum, palladium and rhodium, and 3 to 15 weight percent of a base metal of the VIII group of the periodic table.

2. An alloy as claimed in claim 1, having the following composition: 25% osmium, 35% iridium, 13% ruthenium, 10% platinum, 1% rhodium, 12% rhenium, and 4% cobalt.

3. An alloy as claimed in claim 1, having the following composition: 35% osmium, 40% iridium, 10% ruthenium, 9% platinum, 3% rhodium, and 3% cobalt.

4. An alloy as claimed in claim 1, having the following composition: 30% rhenium, 5% osmium, 38% iridium, 12% ruthenium, 9% platinum, 1% rhodium, and 5% cobalt.

5. An alloy as claimed in claim 1, having the following composition: 38% rhenium, 36% iridium, 10% ruthenium, 10% platinum, 1% rhodium; and 5% cobalt.

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