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SPINNERETTES AND METHOD OF PRODUCTION

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10 Claims. (Cl. 75—126)

The trend in the development of synthetic fibers is towards higher temperatures and pressures during the extrusion operation. This trend has imposed requirements for higher resistance to erosion, corrosion and heat on the alloys of which the spinnerettes are composed.

Whereas many efforts have been directed towards the solution of this problem, prior to this time, the alloys have contained inordinate inclusions of silicates, sulphides, oxides and/or other metalloids whose characteristics have introduced additional problems and difficulties.

By the proper selection of components and the proper procedure in alloying them, the present invention has for the first time provided the industry with spinnerettes and alloys for producing them which are adequately resistant to the destructive influences to which they are subjected in practice.

Spinnerettes in accordance with the prevent invention are composed of vacuum melted austenitic alloys containing 16% to 29% chromium, 2½ to 9% molybdenum, less than 0.05% carbon, 8 to 20% of an element rendering the alloy austenitic, and the remainder substantially iron. The element rendering the alloy austenitic may be nickel or manganese. In the case of nickel, the element may be present in proportions of 8 to 14% or 18 to 20%. Where the element is manganese, it is preferably present in proportions of from 14 to 16%.

Preferably, the carbon content is less than 0.03%. According to one composition, a preferred proportion of molybdenum is from 2½ to 5%. According to another specific example, a preferred proportion of chromium is from 16 to 22% and in accordance with still another example, a preferred proportion of chromium is 22 to 29%.

The process of producing austenitic spinnerette alloys according to the present invention comprises melting and alloying under vacuum conditions: 16 to 29% chromium, 2½ to 9% molybdenum, less than 0.05% carbon, 8 to 20% of an element rendering the alloy austenitic, and the remainder substantially iron.

Specific examples of compositions which have produced highly satisfactory results in this behalf are as follows:

Example I

	Percent
Chromium	16 to 22
Molybdenum	3 to 9
Nickel	8 to 14
Carbon	Less than 0.03
Iron	Remainder

Example II

Chromium	22 to 29
Molybdenum	3 to 6
Manganese	14 to 16
Carbon	Less than 0.03
Iron	Remainder

Example III

Chromium	16 to 18
Molybdenum	2½ to 3
Nickel	10 to 14
Carbon	Less than 0.05
Iron	Remainder

Example IV

Chromium	25 to 27
Molybdenum	2½ to 5
Nickel	18 to 20
Carbon	Less than 0.05
Iron	Remainder.

In the production of these alloys, conventional vacuum melting procedures are followed with various forms of apparatus known to those skilled in the art with the result that silicates, sulphides, oxides and other metalloid inclusions commonly encountered in the production of alloys are substantially completely eliminated, solving one of the serious problems which has been encountered over the years in the manufacture of spinnerettes.

It will be observed that the alloys are all austenitic, containing from 2½ to 9% molybdenum, less than 0.55% carbon and all contain chromium and iron. By maintaining the carbon content at or below such a low amount, very desirable characteristics have been achieved with this alloy.

The manganese and nickel possess the common characteristic of rendering the alloy austenitic and they also occur in the same series of the periodic tables of elements.

Although only four specific examples have been set forth to illustrate the invention, they should not be construed as limiting beyond the scope of the appended claims.

I claim:

1. A spinnerette composed of a vacuum melted austenitic alloy containing 16 to 29% chromium, 2½ to 9% molybdenum, less than 0.05% carbon, 8 to 20% of an element rendering the alloy austenitic, and the remainder substantially iron.

2. A spinnerette as set forth in claim 1 wherein said element is nickel.

3. A spinnerette as set forth in claim 1 wherein said element is from 8 to 14% nickel.

4. A spinnerette as set forth in claim 1 wherein said element is manganese.

5. A spinnerette as set forth in claim 1 wherein said element is from 14 to 16% manganese.

6. A spinnerette as set forth in claim 1 wherein the alloy contains less than 0.03% carbon.

7. A spinnerette as set forth in claim 1 wherein the alloy contains 2½ to 5% molybdenum.

8. A spinnerette as set forth in claim 1 wherein the alloy contains 16 to 22% chromium.

9. A spinnerette as set forth in claim 1 wherein the alloy contains 22 to 29% chromium.

10. A process of producing austenitic spinnerette alloys comprising melting and alloying under vacuum conditions: 16 to 29% chromium, 2½ to 9% molybdenum, less than 0.05% carbon, 8 to 20% of an element rendering the alloy austenitic, and the remainder substantially iron.

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U. S. DEPARTMENT OF COMMERCE

PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,819,161 January 7, 1958

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 31, for "prevent" read -- present --; column 2, line 25, for "0.55%" read -- 0.05% --.

Signed and sealed this 25th day of February 1958.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents