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ALLOY.

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To all whom it may concern:

Be it known that I, CHARLES ALEXANDRE FONTANE, a citizen of the French Republic, residing at 12 Cite Popincourt, Paris, France, have invented certain new and useful Improvements in Alloys, of which the following is a specification.

This invention relates to a new alloy, consisting chiefly of aluminium and containing neither tin nor zinc; that is to say it is not injurious to health, a fact which renders it very suitable for use in the manufacture of culinary vessels. As it further contains no magnesium, it lends itself readily to autogenous soldering and also to tempering so as to preserve its resisting qualities.

The composition of the improved alloy is as follows: 95–96% aluminium, 4–3% copper, 0.8–0.2 manganese, 0.2–0.8 silver, the manufacture of the alloy without the use of any flux is effected in the following manner:—

The aluminium is placed in a plumbago crucible. When it commences to become pasty, the firing must not be too energetic so that burning may be avoided. At this time the copper is added which copper could be slightly heated previously so as not to lower the temperature of the bath. The mixture is suitably stirred with a plumbago rod to ensure thorough mixing, then the silver is added.

These operations are performed without unduly raising the temperature.

For the last operation the manganese is first transformed into cupro-manganese in the proportions of 30 to 32%. This cupro-manganese is fused separately in a plumbago crucible whilst avoiding oxidation. When the product begins to precipitate and falls to the bottom of the crucible in lumps, it is run into the bath. It is then agitated so that the alloy thus constituted may be well fused and perfectly homogeneous. When it has been determined with certainty that the product thus obtained is not burnt and that it is perfectly satisfactory, it is run into ingot moulds to form plates. When it is to be run into sand or into shell the temperature may be slightly lowered according to the thickness. In view of the fact that the shrinkage is about the same as that of aluminium it is necessary to provide considerable running space to supply the mould during cooling.

The properties of the new alloy are the following:—

It can be rolled very satisfactorily and in all thicknesses.

Tension tests carried out in the laboratories of the "Arts et Metiers" with a thickness of 15/10 mm. have given the following results:—

Resistance. Breaking strain 48 to 50 kg. per square millimeter.

Limit of elasticity 32 to 35 kg. per square millimeter.

Elongation 8.9 to 10.9%.

Density 2.78 to 2.9.

In regard to breaking, according to tests carried out in the laboratories of the "Arts et Metiers" upon a bolt with six faces, 110 mm. long and 18 mm. in diameter screw threaded with a 2.0 mm. thread for a length of 40 mm. and provided with a hexagonal nut, the pull between the head of the bolt and the hexagonal nut showed the breaking strain was 7500 kg., the density being 2.814.

This alloy is very malleable, is bent very easily, is adapted to be embossed and retains the exact shape when stamped. It is unaffected by air and inoxidizable. It resists powerfully nitric and sulphuric acids as well as organic acids, but caustic alkalis and hydrochloric acid attack it strongly. It is more inalterable in air than all metals, except platinum. It is very expansible, nearly twice as much so as steel and a little more so that silver. Its powers of resistance mentioned above which are considerable are not obtained with heat treatment, but are the natural properties of the alloy due to its composition. Its great malleability and small density place this new product in the front rank of all known alloys. Its melting point is about 700° to 725°. Its colour is slightly bluish and it will take a fine polish equal to that taken by nickel or silver.

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

An alloy consisting of:—95 to 96% aluminium, 4 to 3% copper, 0.8 to 0.2% manganese, 0.2 to 0.8% silver.

In testimony whereof, I have signed my name to this specification at Paris, France, this 21st day of January, 1924.

FONTANE, CHARLES ALEXANDRE.