

# UNITED STATES PATENT OFFICE.

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## ALLOY.

No Drawing.

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*To all whom it may concern:*

Be it known that I, GERALD R. BROPHY, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Alloys, of which the following is a specification.

My invention relates to a new and useful alloy, and more particularly, to an alloy, adapted to withstand repeated heating and cooling in the ordinary heat treating ranges without cracking.

My new alloy contains iron, aluminum, and molybdenum. Whatever the underlying cause may be, experiment has demonstrated the beneficial results arising from the use of molybdenum. The percentages of these various ingredients may vary within relatively wide limits. The aluminum usually comprises at least six per cent of the entire alloy, with the molybdenum between one and three per cent, the remainder of the alloy being commercial iron, which iron serves as the base of the alloy. One of the best mixtures is ten per cent aluminum and two per cent molybdenum, and the balance of iron. I have found that it is possible to obtain a much finer grain by the addition of a small percentage of titanium. This should be less than one and one-half per cent, and the best value, I believe, is one-half per cent.

In order to produce this alloy it is necessary that the iron be prevented from oxidizing during the casting process, and for this purpose I use a cryolite flux which floats on the molten metal and which may be withdrawn in the usual manner.

The alloy made as described above, has been used for making castings used in the

heat treatment of steel, such as carbonizing etc. which have been subjected to repeated heating and cooling. This usage did not have any bad effect on the metal and the castings did not crack under this service.

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

1. An alloy having an iron base, and containing aluminum and from 1 to 3 per cent of molybdenum, the percentage of aluminum being at least twice that of the molybdenum.

2. An alloy having iron as a base and containing at least six per cent aluminum, and one to three per cent molybdenum.

3. An alloy having iron as a base and containing about ten per cent aluminum and about two per cent molybdenum.

4. An alloy having an iron content of at least 80 per cent, the remainder being composed of aluminum, from 1 to 3 per cent of molybdenum, and less than 1½ per cent of titanium, the percentage of aluminum being at least twice that of the molybdenum.

5. An alloy having iron as a base, and containing at least six per cent aluminum, one to three per cent molybdenum, and less than one and one-half per cent of titanium.

6. An alloy having iron as a base and containing about ten per cent aluminum, about two per cent molybdenum and about one-half per cent titanium.

7. An alloy containing between 80 and 90 per cent of commercial iron, the remainder being composed of at least 6 per cent of aluminum, from 1 to 3 per cent of molybdenum, and about ½ per cent of titanium.

In witness whereof, I have hereunto set my hand this 5th day of August 1920.

GERALD R. BROPHY.