UNITED STATES PATENT OFFICE.

HERMANN G. C. THOFEHRN, DECEASED, LATE OF ROSELLE, NEW JERSEY, BY DONALD H. McLEAN, ADMINISTRATOR, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO LIGHT METALS COMPANY, OF ELIZABETH, NEW JERSEY, A CORPORATION OF NEW JERSEY.

PROCESS OF MAKING AND USING METAL SCAVENGING ALLOY.

1,415,733. Specification of Letters Patent. Patented May 9, 1922.

No Drawing. Application filed February 2, 1920. Serial No. 355,667.

To all whom it may concern:

Be it known that HERMANN G. C. THOFEHRN, deceased, a citizen of the United States, residing at Roselle, in the county of Union and State of New Jersey, did during his life invent certain new and useful Improvements in Processes of Making and Using Metal Scavenging Alloy, of which the following is a specification.

This invention relates to a process of obtaining a scavenging alloy, and to an alloy, which is useful as a refining agent in metal-founding. Such an alloy added to the molten metal aids in the rejection of the impurities present in the latter, and in the elimination of the occluded gases and vapors, and causes a movement of the metal in the molds whereby a more uniform casting is obtained.

The alloy itself consists of aluminium, uranium and magnesium, the relative proportions of the ingredient, and the amount of the alloy used, varying with the chemical and physical characteristics of metal to be cast.

The following specific example is given to illustrate the application of this invention to the casting of open hearth basic steel.

A ferro-uranium alloy, containing 25% to 45% of uranium, is melted in a crucible to a bright red temperature considerably above its melting point, and to it is added pure aluminium, the proportion being of about eleven pounds of uranium to one hundred pounds of aluminium. A violent reaction takes place, and after the completion of this reaction, the fluid contents are cast in bars. A residue will be left in the ladle which is rejected. The bars crystallize on cooling, the crystals being large and bright, and consisting of an uranium-aluminium alloy.

Obviously, the uranium may be introduced into the crucible in some other form than that of ferro-uranium. For instance, the oxides, UO_2 or U_3O_8 may be used.

A molten bath is then prepared by melting aluminium in a crucible or furnace, and to this bath is added magnesium, and the uranium aluminium alloy above described. In doing this I use 44000 parts of aluminium, 3170 parts of magnesium, and 150 parts of uranium aluminium alloy. The resultant molten alloy is then cast. An analysis shows the following composition,—

Mg	6.70
Cu	.25
Fe	.35
Si	.30
Al (by difference)	93.40
U	trace

This forms a scavenging alloy.

In using this alloy the steel is made and melted in the usual manner, and to the molten metal, preferably while being teemed in the ladle, the alloy is added in the proportion of from one to two parts of alloy, to 4000 parts of steel. For instance, with .25–.30 carbon steel, about $\frac{3}{4}$ of a pound of the alloy will be used per ton of steel. The addition of the alloy to the molten steel, causes a rapid vertical circulating motion of the molten metal in the ladle, and in the mold when poured therein. This motion assists in bringing to the surface the slags, gases and vapors in the molten metal, and thus produces a sounder and more homogeneous casting.

It is believed that the presence of uranium in the alloy permits the segregation in the slag of aluminium oxides which would otherwise remain in the steel. The slag rejected by the metal in cooling in the presence of the alloy is light grey in color, and separates from the metal. The metal itself shows no traces of alumina.

The proportions of uranium and aluminium used in preparing the alloy may be varied from those given above.

Likewise, the proportions of the uranium and magnesium contents used in preparing the scavenging alloy may be changed to meet conditions of the metal to be treated. For instance, the magnesium may be increased to about 15% of the bath, and the uranium contents may be increased by reducing the amount of aluminium in the bath.

Having thus described the invention what is claimed is:—

1. The herein described process of obtaining a uranium aluminium alloy, consisting in melting together ferro-uranium and aluminium, separating the molten material from the slag resulting from such process and allowing the molten material to cool.

3. The process of preparing a metal
venging composition, consisting of pre-
ing an alloy of uranium and aluminium
l permitting the same to solidify and
ling solidified alloy to a molten bath of
minium and magnesium.

4. The hereinbefore described process of
paring a metal scavenging composition,
sisting of preparing an alloy of uranium
l aluminium containing approximately
% uranium and adding it in the propor-
tion of 150 parts of the alloy to a molten
bath containing 47,000 parts of aluminium
and magnesium.

4. process of metal founding, which con- 15
sists of adding to molten metal prior to
pouring the same in the mold, a scavenging
alloy containing magnesium, aluminium and
a small percentage of uranium.

DONALD H. McLEAN,
Administrator of the estate of Hermann G. C. Thofehrn, deceased.