

UNITED STATES PATENT OFFICE

2,592,337

METHOD OF CHILL CASTING BRASS AND
OTHER COPPER ALLOYS CONTAINING ZINC

Neil Douglas Gordon Robertson, Hartsbourne,
Bushey Heath, and George William Browne,
London, England, assignors to The Non-Fer-
rous Die Casting Company Limited, London,
England

No Drawing. Application July 23, 1949,
Serial No. 106,498

6 Claims. (Cl. 22—189)

1

This invention relates to the casting of brass and other copper alloys containing zinc in metal moulds or dies, i. e. by the so-called permanent die casting, and is particularly applicable to gravity casting, though it can also successfully be used in low pressure casting.

As hitherto practiced the casting of zinc-containing alloys in permanent dies is subject to the great disadvantage that zinc oxide builds up on the die faces in a very firmly adherent form, and after every few castings the die must be scraped and chipped to remove the deposit. This is wasteful of time and labor, and the continual scraping of the die faces soon renders the die unfit for accurate casting owing to dimensional changes.

Our researches have shown that the firm attachment of the build-up of zinc oxide to the die faces is due to the presence in the build-up of particles of metallic zinc which appear to "anchor" the oxide deposit to the die face.

It is an object of this invention to provide means whereby this build-up is avoided wholly or in part and the deposit is prevented from firmly adhering to the die face. A further object is to provide a dressing which, when applied to the die face before casting, prevents or diminishes the build-up of zinc oxide on the die face. A still further object is to provide an improved method of casting of brass and other copper-zinc alloys in permanent dies.

These objects are achieved by the invention now to be described.

According to the present invention there is applied to the runners, die-faces or cores used in the chill casting of brass or other copper alloy containing zinc, a dressing of a metal oxide capable at pouring temperatures of reduction to a lower oxide by metallic zinc. Examples of such metal oxides are manganese dioxide, manganese sesquioxide, trimanganese tetroxide, ferric oxide, triferri-tetroxide. These may be used singly or in admixture amongst themselves or with inert diluents. Manganese dioxide is found to give the most consistently successful results, and in the following more detailed description the invention will be described with reference to manganese dioxide. It is to be understood that in place of manganese dioxide we may use any of the oxides named or any other metal oxide reducible to a lower oxide by metallic zinc at pouring temperatures.

The manganese dioxide dressing may be applied in the form of an aqueous suspension by spraying

2

or dipping. In order to maintain the oxide in suspension the mixture of manganese dioxide and water may be mechanically stirred. Dispersing agents, such as sulphite cellulose pitch, sulphated long-chain fatty alcohols, or alkylnaphthalene-sulphonates, may be added.

Manganese dioxide acts as an insulator and so helps to maintain the fluidity of the molten metal in the die. If desired one of the usual lubricants, e. g. powdered graphite, may be added to the suspension.

A suitable dressing may be made by stirring one part of powdered manganese dioxide into ten parts by weight of water to which has been added 0.25 to 0.30 part by weight of a 10% solution of tannic acid in commercial alcohol.

The mixture is preferably sprayed on to the die. After the first casting, the die will of course be hot, and we find it advantageous to cool it down to about 200–250° C., usually by dipping in water. At such temperatures, or even below 200° C., an effective dressing of manganese dioxide is produced on the die.

Preferably, before applying the dressing we remove any particles of metal left on the die from a previous casting by the use of a pressure spray.

When brass or other copper-zinc alloy is cast in a die treated with a dressing of manganese dioxide according to the invention a perfectly clean casting results, and even after a number of successive castings there is little or no build-up of zinc oxide on the die. Any deposit on the die is readily removed in the cooling dip or by the light brushing which precedes the application of the dressing for the next casting.

The dressing has been found successful even in such difficult cases as lead brasses containing up to 2–3% of lead, which with ordinary dressings show a heavy build-up after only a few castings.

What is claimed is:

1. The method of chill casting brass and other copper alloys containing zinc in metal molds or dies, which includes the step of applying to the die faces a dressing of a metal oxide capable of being reduced to a lower oxide by metallic zinc at pouring temperatures.

2. The method of chill casting brass and other copper alloys containing zinc in metal molds or dies, which includes the step of applying to the die faces a dressing consisting essentially of a substance selected from the group consisting of the higher oxides of iron and manganese.

3. The method of chill casting brass and other copper alloys containing zinc in metal molds or

3

dies, which includes the step of applying to the die faces a dressing of manganese dioxide.

4. The method of chill casting brass and other copper alloys containing zinc in metal molds or dies, which includes the step of applying to the die faces a dressing of manganese dioxide in the form of an aqueous suspension.

5. The method of chill casting brass and other copper alloys containing zinc in metal molds or dies, which includes the step of applying to the die faces a dressing of manganese dioxide in the form of an aqueous suspension, the die faces having previously been cleaned from adhering particles of metal by means of a high-pressure spray.

6. The method of chill casting brass and other copper alloys containing zinc in metal molds or dies, which includes the steps of first cooling the die to a temperature within the range 200-250° C. and then applying to the die faces a dressing of manganese dioxide in aqueous suspension.

NEIL DOUGLAS GORDON ROBERTSON.
GEORGE WILLIAM BROWSE.

4

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
49,272	Hursh	Aug. 8, 1865
93,155	Johnston	July 27, 1869
119,682	Yielding	Oct. 3, 1871
335,628	Riddle	Feb. 9, 1886
413,815	Taylor	Oct. 29, 1889
843,426	Acheson	Feb. 5, 1907
1,505,176	Udale	Aug. 19, 1924
1,517,778	Frohman	Dec. 2, 1924
1,560,838	Meloche	Nov. 10, 1925
1,770,684	De Witt	July 15, 1930
1,837,772	Hailwood	Dec. 22, 1931
1,934,626	Nagelvoort	Nov. 7, 1933
1,965,340	Heinicke	July 3, 1934
1,995,349	Heinicke	Mar. 26, 1935
2,259,457	Croll	Oct. 21, 1941

OTHER REFERENCES

Die Casting by Herb, 1936, page 249.