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UNITED STATES PATENT OFFICE.

FRITZ GREINER, OF STUTTGART-CANNSTATT, GERMANY.

PROCESS FOR PRODUCING TRANSPORTABLE AND WORKABLE SHAPES FROM IRON ALLOYS.

No Drawing. Application filed August 30, 1921. Serial No. 496,978.

To all whom it may concern:

Be it known that I, FRITZ GREINER, citizen of Germany, residing at Stuttgart-Cannstatt, Germany, have invented new and useful Improvements in Processes for Producing Transportable and Workable Shapes from Iron Alloys, of which the following is a specification.

In my copending application Serial No. 441,819 filed Feb. 2nd 1920 a process is described for protecting iron alloys containing a high percentage of silicon, manganese, phosphorus or the like against burning while being melted in a metallurgical furnace, this process consisting in enveloping the alloy, in the form of fragments or powder, in a fire-resisting coating prior to the introduction thereof into the furnace, the said coating preferably consisting of Portland cement. In this process the fragmentary or powdery alloy could be made up in pieces or shapes, such as briquettes, by means of the binding agent employed and then introduced in this form into the furnace, the binding agent used being preferably Portland cement. Further advice given in the said application is to the effect that any large parts that might be present in the alloy to be treated should be first reduced to the size of hazelnuts and then dealt with in the manner described, together with the smaller fragments, if any such be present.

It has now been found that this process is not only applicable to the protection of alloys of iron with silicon, manganese or phosphorus, but may also be advantageously used in protecting all iron alloys which contain in addition to iron or one of the said substances—and in which carbon may or may not be present—further elements or components such as nickel, cobalt, tungsten, and boron. The process is not only applicable to the protection of pieces or shapes which contain elements or components that merely mix with the particular alloy, but is also applicable to the protection of pieces or shapes, which contain elements or components, that in addition to merely forming a constituent part of the alloy, are intended to initiate or effect some kind of chemical transformation, as for example thermite, alkalis etc. If, in the case of such admixtures which are intended to effect a chemical transformation, the substances dealt with are such that they would be decomposed or dissolved by water, they must be enclosed in envelopes or shells which are capable of resisting the moisture to which they are subjected during the making up of the pieces or shapes, and which consist of a material that is not derogatory to the purpose aimed at. Such shells are for example: sheet metal cans, wooden boxes, coatings of varnish or the like.

If it should be considered preferable to first disintegrate the alloys for the purpose of producing the pieces or shapes this disintegration should preferably be effected not by blows or by grinding, but by granulating the red hot molten alloy in a known manner, as by means of revolving drums or disks.

The above described modification of the process under discussion is capable of a much wider application than the original process, because the advantages accruing from protecting or binding with cement can thereby be extended to any mixture or alloy containing iron or silicon in any form.

Examples.

1. 150 kgs. of an alloy of 90% of iron and 10% of nickel are reduced to fragments of the size of hazelnuts and mixed with 30 kgs. of Portland cement and 20 kgs. of water and made up, by the procedure adopted in producing molded concrete blocks, into 70 pieces or shapes each weighing about 3½ kgs. in a dry state, the form imparted to the pieces or shapes being preferably that of short cylinders so as to make them easy to handle. These packages may be kept for any length of time and used for reducing iron alloys containing little nickel.

2. 150 kgs. of cast iron is granulated in a red hot molten condition by allowing it to flow onto rapidly rotating disks. 3 kgs. of ordinary carbonate of soda is portioned out into 30 sheets metal cans or boxes containing 100 grams each. The 150 kgs. of iron with 25 kgs. of Portland cement and 20 kgs. of water is then molded or made up into 30 pieces or shapes into each of which one of the cans or boxes having 100 grams of soda therein is introduced so that each package contains 5 kgs. of iron and 100 grams soda. Such packages may also be kept for any length of time and may be used for carrying out certain metallur-

gical transformations in which the presence of alkali is necessary.

I do not claim broadly the method of producing pieces or shapes whose essential component consists only of ferro-silicon, ferro-manganese or ferro-phosphorus, but

I claim:

1. The process for producing transportable and workable shapes from metallic alloys containing iron, which consists in mixing pieces of said metallic alloy with a refractory binding agent, consisting of a quick binding refractory cement and water, and introducing into the mixture an additional substance or substances protected against the action of the water.

2. The process for producing transportable and workable shapes from metallic alloys containing iron, which consists in reducing the coarse pieces of said metallic alloy to fragments of about the size of hazelnuts, mixing these fragments with the smaller pieces of said metallic alloy, mixing the said fragmentary and smaller pieces of said metallic alloy with a refractory binding agent and forming the entire mixture into blocks.

3. The process for producing transportable and workable shapes from metallic alloys containing iron, which consists in reducing the coarse pieces of said metallic alloy into granules by any known granulating process; mixing these granules with a refractory binding agent and forming the entire mixture into blocks.

4. The process of producing masses from metallic alloys containing iron, which consists in mixing suitably sized pieces of said metallic alloy with a binding agent which will not be affected by temperatures less than the melting temperature, and shaping the resulting mixture into blocks of suitable size.

5. The process of producing masses from metallic alloys containing iron, which consists in granulating the coarser pieces of said metallic alloy, mixing the granulated alloy with the finer pieces thereof, mixing the granulated and finer pieces of said alloy with a refractory binding agent which will not be affected by temperatures less than the melting temperature, and shaping the resulting mixture into blocks of suitable size.

6. The method of producing masses from metallic alloys containing iron, which consists in mixing pieces of said metallic alloy of suitable size with a refractory binding agent and water, and introducing into the mixture additional substance or substances enclosed within a protecting enclosure or envelope capable of protecting said substance from the action of the water.

In testimony whereof I have signed my name to this specification.

FRITZ GREINER.