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⑤④ **Method for manufacturing a body comprised of molten-steel soluble elements.**

⑤⑦ There is described a method for manufacturing by compressing, a body comprised of granule- or powder-like elements which are soluble in a molten-steel bath, said elements being formed by active materials lighter than steel and volatile in the molten-steel bath, such as notably calcium or magnesium, and inert materials, such as iron or nickel powder, which comprises producing said body in an isostatic press.

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METHOD FOR MANUFACTURING A BODY
COMPRISED OF MOLTEN-STEEL SOLUBLE ELEMENTS.

This invention relates to a method for manufacturing by compressing, a body which is comprised of granule- or powder-like elements which are soluble in a molten-steel bath, which elements are formed by active materials which are lighter than steel and are volatile in the molten-steel bath, such as notably calcium or magnesium, and inert materials, such as iron or nickel powder.

Adding calcium for example to a molten-metal bath to remove impurities by forming floating components, is a known technique.

U.S. Patent 4,233,064 discloses a series proposals which are made to avoid that components compressed into briquettes or similar shaped parts would rapidly rise to the bath surface where they cause explosions and sparks, and generate a substantial amount smoke.

According to this Patent, it is proposed to compress the components into a hollow cylinder and to dip said body into the molten metal, and actually under such conditions that the components of the dipped cylinder are progressively released in the melting bath, to have this body form a continuous replacement base for the calcium being used and the calcium concentration in the steel bath should not rise above the solubility limit.

To make this possible even in the required conditions, the body to be dipped has to have a very strong homogeneity and a very high uniformity in the compactness of the

components thereof. When this is not the case, there is an actual danger that the required decomposition of the body in the molten bath will be opposed and that there will precisely appear the disturbing phenomenoms which it is desired to avoid with
5 the dipping of said cylinder-shaped body in the molten bath.

To obtain the desired object according to the invention and to avoid that too large a calcium amount should react with the air and not combine with the impurities in the steel, the pertaining body should not only be produced under a very
10 high pressure, as already mentioned at the start, but also the homogeneity of the inner structure thereof should be faultless.

To obtain such a result, said body is produced in an isostatic press.

Still according to the invention, said body is
15 pressed inside a distortable mould.

According to this embodiment, use is made of a press mould from elastomer.

According to another possible embodiment of the invention, use is made of a distortable press mould from metal.

20 According to a further embodiment, use is made of a mould comprised of a plastic bag.

Other details and features of the invention will stand out from the following description, given by way of non limitative example, of a method for producing a body formed
25 by active and inert components.

The body which is to be dipped into a molten-steel bath, is comprised of a compressed mixture comprising a first material or material group with a limited solubility in the steel, and a second material or material mixture which is inactive in the steel, and may for example be iron or nickel.
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In said U.S. Patent 4,233,064, the drawbacks which accompany an uncontrolled reaction of the calcium with the molten steel, are clearly described.

Even if best results are obtained with hollow cy-

linder-shaped bodies comprised of the above-defined materials, problems are encountered when the homogeneity and the compactness of the body inner structure can not be called exceptionally regular.

5 It has now been determined by the Applicant that such properties may actually be obtained when the body to be formed, generally even if not necessarily a cylinder-shaped body, with a center hollow extending along the lengthwise axis, is produced in an isostatic press.

10 It is to be preferred to press the body to be formed inside a distortable mould.

 Such a distortable mould may be comprised of an elastomer cylinder, but a cylinder from light distortable metal or plastic bags or sleeves also show best results.

15 The very high pressures which the isostatic press can generate, but mostly the fact that the pressure can be generated in every direction, allows to produce shaped parts with the required compactness and homogeneity.

20 When dipping in a molten-metal bath, the body components react exceptionally regularly and safely.

 Repeated and multiple tests have shown that this may only be expected from bodies comprised of powders or granules which are produced according to the isostatic press method.

25 A detail of importance of the invention lies in the pressing of said bodies being made by using preferably oil instead of water-like or glycol-containing liquids. Oil with a low viscosity under high pressure is to be preferred. When using water, water-like or glycol-containing solutions, with a leak from the cylinder or the body contacting the liquid used during the
30 isostatic pressing, hydrating of the compressed components occurs, which leads to a fire danger, independently of the damage to the product itself.

 Even if a particular importance has been given in the above description to the compressing of iron and calcium,

it is further possible to mention magnesium as active component,
and nickel as inert material.

5 It must be understood that the invention is in no
way limited to the above embodiments and that many changes may
be brought thereto without departing from the scope of the inven-
tion as defined by the appended claims.

CLAIMS.

1. Method for manufacturing by compressing, a body comprised of granule- or powder-like elements which are soluble in a molten-steel bath, said elements being formed by
5 active materials lighter than steel and volatile in the molten-steel bath, such as notably calcium or magnesium, and inert materials, such as iron or nickel powder, which comprises producing said body in an isostatic press.

2. Method as defined in claim 1, which further
10 comprises pressing said body inside a distortable mould.

3. Method as defined in claim 2, which further comprises making use of a mould from elastomer.

4. Method as defined in claim 2, which further comprises making use of a mould from metal.

5. Method as defined in claim 2, which further
15 comprises making use of a mould formed by a plastic bag.

6. Method as defined in any one of claims 1 -
5, which comprises using in the isostatic press, to replace a water-like or glycol-containing liquid, an oil with low viscosity
20 under high pressure.

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Office

EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	US-A-3 314 787 (GOODRICH et al.) * columns 3a,4 *	1	C 21 C 1/10 C 21 C 7/00 C 22 C 35/00
A,D	--- US-A-4 233 064 (DUNN)		
A	--- DE-B-2 038 739 (TELEDYNE INDUSTRIES)		
A	--- DE-B-1 302 000 (GESELLSCHAFT FÜR ELEKTROMETALLURGIE) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			C 21 C 1/10 C 21 C 7/00 C 22 C 35/00
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 30-09-1985	Examiner SUTOR W
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	