



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.03.2012 Bulletin 2012/10

(51) Int Cl.:
B66C 23/72 (2006.01)

(21) Application number: **11180053.8**

(22) Date of filing: **05.09.2011**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(72) Inventors:
• **Peñagaricano García, Jon Ander**
20492 Berastegi, Gipuzkoa (ES)
• **Delgado García, Manuel**
31192 Mutilva, Navarra (ES)
• **Garmendia Izaguirre, Esteban**
20014 Donostia, Gipuzcoa (ES)

(30) Priority: **07.09.2010 ES 201001151**

(71) Applicant: **D-3 Ingeniera Y Desarrollo S.L.**
20150 Aduna Guipuzcoa (ES)

(74) Representative: **Cabinet Plasseraud**
52, rue de la Victoire
75440 Paris Cedex 09 (FR)

(54) **High-density counterweight**

(57) The present invention relates to a high-density counterweight formed by a block (1) made up of metal

elements (2) aggregated by a binder (3), an outer protective covering (4) being arranged on said block (1).

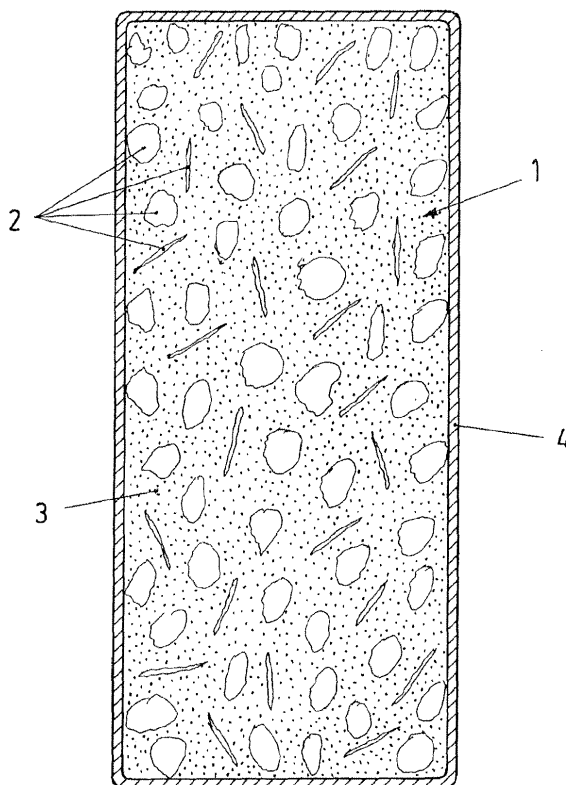


Fig.1

Description

Field of the Art

[0001] The present invention relates to the counterweights used to compensate for strains, to determine stresses and other similar functions in applications such as tower cranes, overhead railway lines, agricultural vehicles susceptible to overturning, etc., proposing a cost-effective, high-density counterweight protected against temperature, weathering, aging and mechanical aggressions, and further having a surface suitable for applying inscriptions.

State of the Art

[0002] Counterweights are widely used for different functions, ranging from preventing overturning in agricultural vehicles or in tower cranes to tensing wires in overhead lines such as those used in railways.

[0003] There are basically two types of counterweights today according to the material used to manufacture them, and they are those made of concrete and those made of iron or steel.

[0004] The concrete counterweights are inexpensive but have a very low density of about 3 kg/l, whereby they are very bulky, not being suitable for certain applications in which the dimensions of the counterweight must be small, such as for example in tensing wires of overhead railway lines for highspeed trains, or in places where there is little available space, such as in agricultural vehicles.

[0005] Concrete counterweights are furthermore fragile with respect to certain impacts and strains to which they are usually subjected in practice, such that to solve this drawback reinforcement elements are often inserted in the concrete, which substantially raises the cost of the end product.

[0006] In addition, the shape of the counterweights must often be adapted to the structures to which they are coupled and in the case of concrete counterweights, it is expensive to manufacture them with complicated shapes.

[0007] Iron or steel counterweights, in turn, can be made in more complex shapes and have a much smaller volume than those of concrete because their density is much greater, being able to reach 7.8 kg/l, but their price is very high due to the fact that the material from which they are made is expensive. The value of the material for building counterweights of this type further favors them being stolen on many occasions when they are arranged in accessible places, such as in overhead railway lines, which causes significant problems in the line and serious risks for those who try to steal the counterweights.

[0008] A type of counterweight is also known in the industry which is made of metal residues from the iron and steel industry, which are mixed with a binder such as cement to obtain a seamless piece, thereby resulting

in a high-density counterweight at a low cost which furthermore dissuades the theft thereof because the materials forming it have little value.

[0009] However, the surface of counterweights of this type has a distribution of several types of materials, in which those metal elements which can rust appear on the surface, said surface being rather unsuitable for bearing inscriptions because they are difficult to engrave and paint falls off, while impressions are barely seen because they have light and dark areas.

[0010] The final finish of the counterweight is furthermore easily attacked by weathering, whereby this type of counterweight is not suitable for specific applications requiring certain aesthetic conditions.

[0011] In turn, in the molding manufacture of these counterweights, the binder for forming them adheres to the mold, whereby it is complicated to demold the piece, it being necessary to apply special treatments on the surface of the mold to aid in demolding.

Object of the Invention

[0012] According to the present invention a high-density counterweight is proposed, of the type formed by metal elements from iron and steel waste immersed in a binder, forming a block on which a protective covering is incorporated, advantageous functional features being obtained because the aggregated body of the mold is protected against temperature, weathering and mechanical aggressions, maintaining an unchanging appearance over time with the possibility of suitably applying inscriptions on the surface.

[0013] This counterweight object of the invention is formed by a block made up of high-density metal elements integrated in a binder, a plastic covering protecting the aggregate being arranged on said block.

[0014] The metal elements integrated in the aggregate of the block of the counterweight are small pieces of metal coming from waste from the iron and steel industry, residual shot, chips from machining processes, etc.

[0015] The binder of the aggregate is made up of a conventional fixing material, such as concrete, resin or plastic which, together with the metal elements, forms a unit block.

[0016] Therefore, the counterweight is a high-density counterweight, around 6 kg/l, having a layer of outer covering which prevents the metal materials of the aggregate block from coming up to the exterior and being able to rust such that the aggregate block of the counterweight is protected against environmental aggressions, the outer covering being able to have the desired color, its appearance and integrity being maintained over time.

[0017] The outer surface formed by the plastic covering is a structurally uniform surface where impressions indicating the weight of the counterweight, the manufacturer's data, the CE mark, etc., can be applied.

[0018] Furthermore, in the event that the aggregate block of the counterweight breaks, the plastic covering

holds the assembly together without the parts of the aggregate block becoming separated.

[0019] In addition, the molding manufacture is considerably simplified because the plastic covering does not adhere to the mold and therefore aids the demolding process, preventing the problem posed in this sense by molding the aggregate block without a covering because the binder sticks to the mold, making it necessary to apply a non-stick coating.

[0020] Therefore, a cost-effective high-density counterweight with features making it long-lasting and aesthetic is obtained, this counterweight object of the invention accordingly having truly advantageous features, acquiring its own identity and preferred character with respect to conventional counterweights for the same applications.

Description of the Drawings

[0021]

Figure 1 shows a schematic depiction of a section of a counterweight made according to the object of the invention.

Figure 2 shows a perspective view of a practical embodiment of the proposed counterweight.

Figure 3 is a side view of the counterweight of the preceding figure.

Figure 4 is a view corresponding to section IV-IV indicated in the preceding figure.

Detailed Description of the Invention

[0022] The object of the invention relates to a counterweight of the type formed by a block (1) made up of metal elements (2) aggregated by a binder (3), with an implementation that forms an external protection of the aggregate block (1) and allows suitably applying inscriptions on the outer surface.

[0023] The proposed counterweight consists of a block (1) formed by metal elements (2) made up of small pieces of metal materials aggregated by a binder (3), a preferably plastic outer covering (4) being arranged on said block (1).

[0024] The metal elements (2) used in forming the block (1) are pieces of metal coming from waste from the iron and steel industries, such as residual chips from cutting, shot-blasting byproducts, metal working residues, etc., while the binder (3) can be any type of material suitable for compacting an aggregate, such as concrete, cement, plastic, resin, etc.

[0025] The outer covering (4) arranged on the aggregate block (1) is preferably made of plastic, such as polyethylene, said outer covering (4) completely enveloping the aggregate block (1) such that it is protected against environmental aggressions and blows, preventing the metal elements (2) from coming to the surface of said block (1), rusting and deteriorating the aesthetics, in ad-

dition to preventing corrosion from altering the counterweight.

[0026] Said outer covering (4) further prevents in the event that the block (1) breaks the parts therein from becoming separated; in turn determining a structurally uniform outer surface on which inscriptions can be suitably applied by means of engraving, painting or impression.

[0027] With this embodiment comprising an aggregate block (1) with an outer covering (4) thereon, the proposed counterweight can adopt any configuration depending on the application for which it is intended, such as for example the embodiment depicted in Figures 3 and 4, as a counterweight for an overhead railway line, without this embodiment being limiting.

Claims

1. A high-density counterweight, consisting of a block (1) formed by residual metal elements (2) from iron and steel industries aggregated by a binder (3), **characterized in that** an outer protective covering (4) is arranged on the aggregate block (1).
2. The high-density counterweight according to claim 1, **characterized in that** the outer covering (4) completely envelopes the aggregate block (1).
3. The high-density counterweight according to claim 1, **characterized in that** the outer covering (4) is made of plastic.

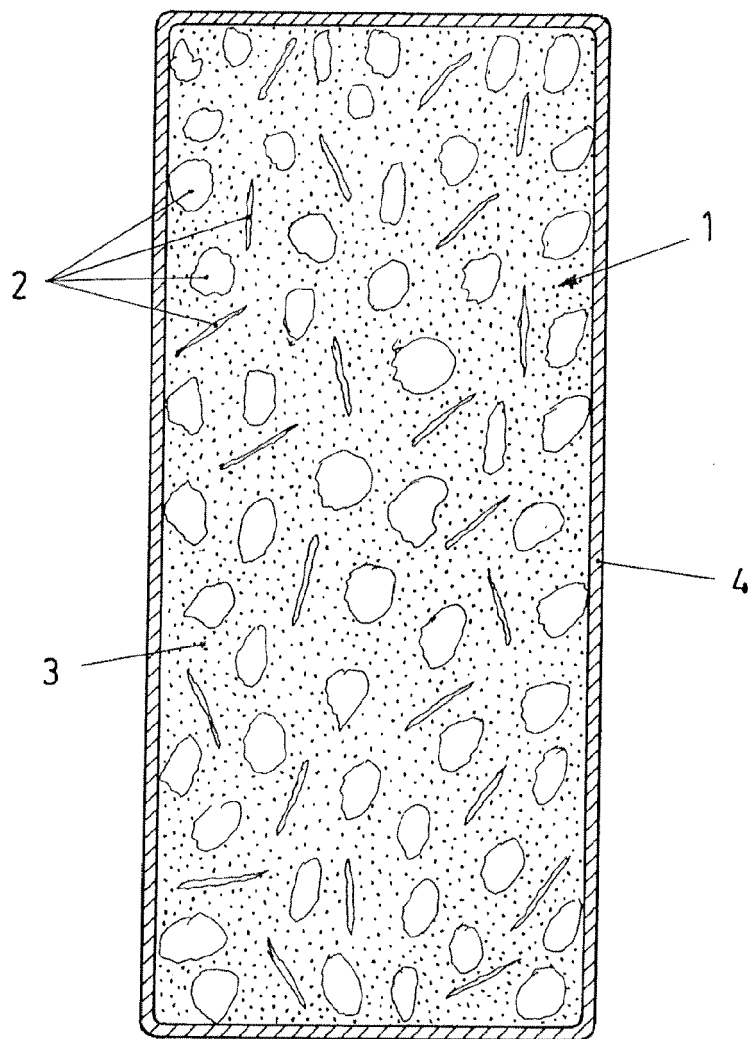


Fig.1

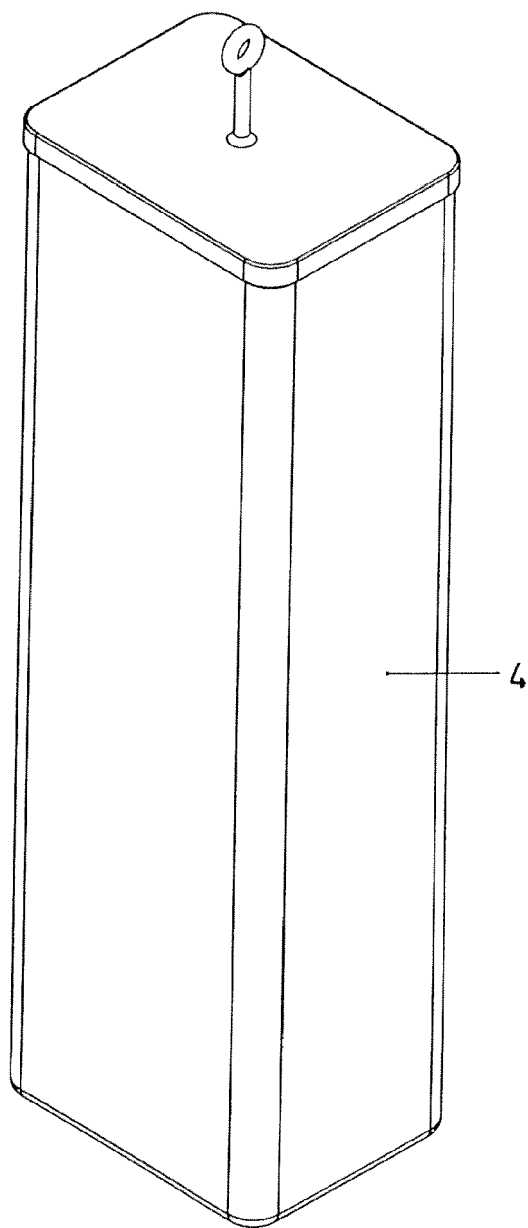


Fig.2

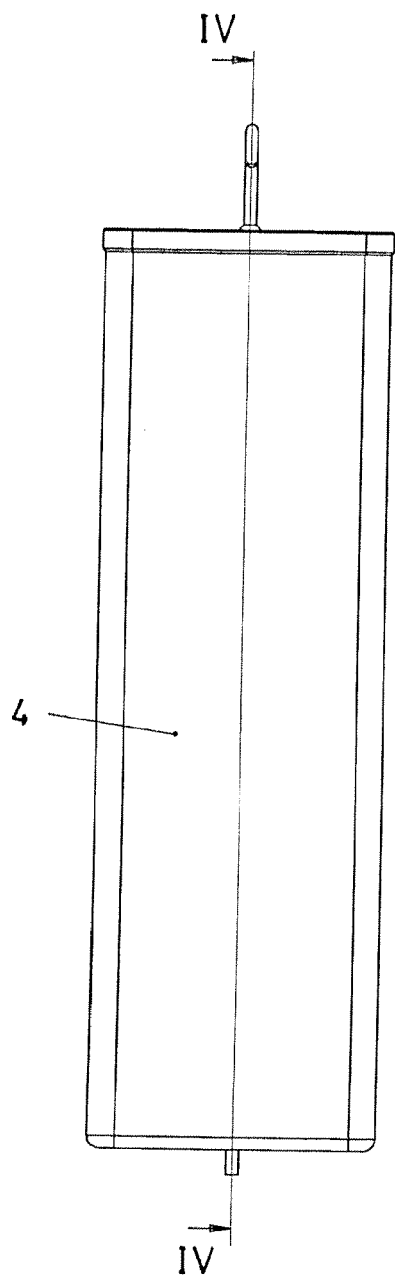


Fig.3

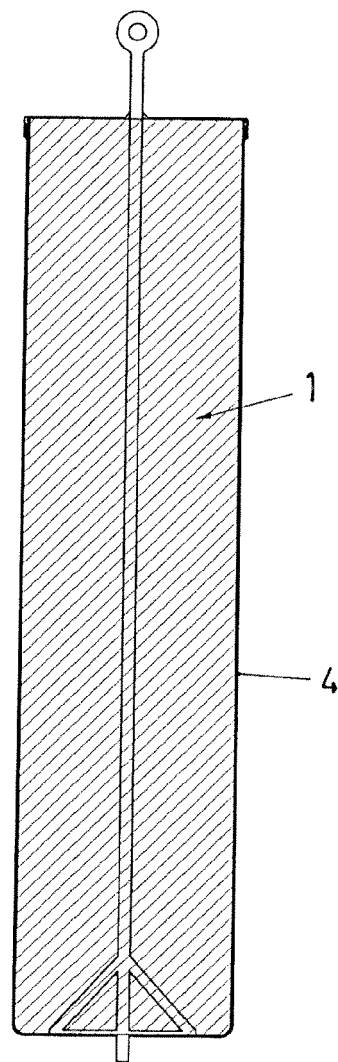


Fig.4