(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 974 991 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
20.01.2016 Bulletin 2016/03

(51) Int Cl.:
B66C 3/04 *(2006.01)* ***B66C 3/16*** *(2006.01)*

(21) Application number: **14382279.9**

(22) Date of filing: **16.07.2014**

(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

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(54) **Device for collecting ferrous materials**

(57) A device for collecting ferrous materials, which comprises a central body (1) fixed to an electromagnetic plate (2), wherein a plurality of radial blades (3) actuated by several hydraulic cylinders (4) arranged between each radial blade (3) and the central body (1) pivots on the edge of the electromagnetic plate (2) and wherein the central body (1) is fixed to a rotary mechanism (5) capable of rotating the device about the vertical axis of the hook of lifting equipment,wherein the central body (1) comprises a plurality of pairs of radial flanges (1.1) between which are arranged the hydraulic cylinders (4), wherein upper ends (1.11) of the pairs of radial flanges (1.1) are fixed to an upper cylindrical ring (1.2) for coupling to the rotary mechanism (5), and lower ends (1.12) of the pairs of radial flanges (1.1) are fixed to the upper face of the electromagnetic plate (2), the rotary mechanism (5) being arranged in the interior of the central body (1).

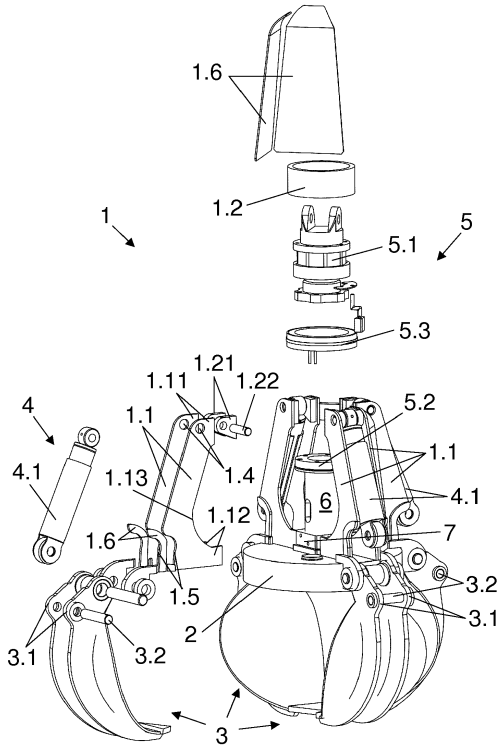

Fig.1

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Description

TECHNICAL SCOPE OF THE INVENTION

[0001] The present invention relates to the field of devices or tools for collecting ferrous materials coupled to the hook of lifting equipment such as cranes, cranes on vehicles, travelling cranes, winches, capstans, hoists, etc.

BACKGROUND TO THE INVENTION

[0002] Various devices or tools which are coupled to lifting equipment for selective handling of objects of ferrous materials are known.

[0003] These devices commonly have an arm for clamping to the lifting equipment fixed to an electromagnetic plate which may incorporate a plurality of auxiliary articulated arms in the form of radial blades for clamping, during lifting and transport, the ferromagnetic material previously attracted by the electromagnetic plate. The radial blades are actuated by hydraulic cylinders.

[0004] These tools for collecting ferrous metals of prior art may also include a rotary mechanism that enables said tool to rotate about its vertical axis, thereby facilitating the positioning of the load, i.e. the objects of ferrous materials it transports.

[0005] However, these rotary mechanisms are normally coupled to the upper part of the clamping arm of the tool, which substantially increases its total height, thereby impeding the handling of said tool.

[0006] The applicant knows of no solution, in the state of the art, which resolves the problems previously described and which, in turn, displays features similar to those displayed by the invention advocated here.

DESCRIPTION OF THE INVENTION

[0007] The present invention is established and characterised in the independent claims, whilst the dependent claims describe other features of the same.

[0008] In the light of the above, the present invention refers to a device for collecting ferrous materials such as those which are coupled to lifting equipment.

[0009] The device comprises a central body fixed to an electromagnetic plate. A plurality of radial blades actuated by several hydraulic cylinders pivots on the edge of the electromagnetic plate, the cylinders being arranged between each radial blade and the central body.

[0010] For its part the central body is fixed to a rotary mechanism suitable for rotating the device about the vertical axis of the hook of lifting equipment.

[0011] Similarly, the central body comprises a plurality of pairs of radial flanges between which are arranged the hydraulic cylinders. That is to say, two flanges for each hydraulic cylinder comprising the device and arranged on both sides of each hydraulic cylinder and orientated radially relative to the electromagnetic plate.

[0012] For their part, the upper ends of the pairs of radial flanges are fixed to an upper cylindrical ring for coupling to the rotary mechanism, and lower ends of the pairs of radial flanges are fixed to the upper face of the electromagnetic plate, the rotary mechanism being arranged on the inside of the central body.

[0013] This enables the rotary mechanism to be incorporated in the device, thus facilitating the positioning of the loads without this increasing the height of the device, which in turn facilitates their handling.

BRIEF DESCRIPTION OF THE FIGURES

[0014] The present specification is supplemented by a set of figures illustrating the preferred embodiment and never exhausting the scope of the invention.

Figure 1 shows a partial exploded perspective view of the device for colleting ferrous materials, with the radial blades in the closed position.

Figure 2 shows a perspective view of the device in Figure 1, with the radial blades in the open position.

DETAILED EXPLANATION OF THE PREFERRED EMBODIMENT OF THE INVENTION

[0015] The present invention is a device for collecting ferrous materials such as those coupled to lifting equipment.

[0016] As shown in Figures 1 and 2, the device comprises a central body (1) fixed to an electromagnetic plate (2). A plurality of radial blades (3), actuated by several hydraulic cylinders (4) arranged between each radial blade (3) and the central body (1) pivots on the edge of the electromagnetic plate (2).

[0017] For its part the central body (1) is fixed to a rotary mechanism (5) capable of rotating the device about the vertical axis of the hook of lifting equipment (not shown in the figures).

[0018] The central body (1) comprises a plurality of pairs of radial flanges (1.1) between which are arranged the hydraulic cylinders (4). That is to say a pair of radial flanges (1.1) is arranged through each hydraulic cylinder (4) incorporated in the device. Said radial flanges (1.1) are orientated in the radial direction relative to the electromagnetic plate (2) on both sides of the hydraulic cylinders (4), acting as lateral protection for the same.

[0019] Similarly, the upper ends (1.11) of the pairs of radial flanges (1.1) are fixed to an upper cylindrical ring (1.2) for coupling to the rotary mechanism (5). The upper ends (1.11) of the pairs of the flanges (1.1) are preferably fixed to the upper cylindrical ring (1.2) by means of lugs (1.21), and a pin (1.22) of said upper cylindrical ring (1.2).

[0020] Similarly, it is preferable for the upper ends (1.11) of the pairs of radial flanges (1.1) to form upper clamping projections (1.4) of the hydraulic cylinders (4) to the central body (1). Thus the pin (1.22) is also used

to fix in an articulated manner the upper end of the hydraulic cylinders (4 both between the radial flanges (1.1) and the lugs (1.21) of the upper cylindrical ring (1.2).

[0021] On the other hand, the lower ends (1.12) of the pairs of radial flanges (1.1) are fixed to the upper face of the electromagnetic plate (2), the rotary mechanism (5) being arranged in the interior of the central body (1). That is to say, the radial flanges (1.1) between the upper cylindrical ring (1.2) and the electromagnetic plate (2) form an interior space which accommodates the rotary mechanism (5). Between the upper (1.11) and lower ends (1.12) the radial flanges (1.1) may comprise an internal central slot (1.13) which increases the interior space of the central body (1).

[0022] This avoids having to arrange the rotary mechanism (5) above the central body (1) which has been arranged in the interior of said central body(1), thus avoiding increasing the total height of the device and facilitating its handling.

[0023] For example, the rotary mechanism (5) may comprise a hydraulic rotor (5.1) which is fixed to the upper cylindrical ring (1.2) of the central body (1) by means of a clamping flange (5.2).

[0024] In addition, the rotary mechanism (5) may comprise an electric collector (5.3) which guarantees the continuity of electricity supply to the electromagnetic plate (2) during its 360° rotation both in one direction and the other. In other words, the device can be rotated to one side or the other without any risks that the cables supplying the electromagnetic plate may be shortened and the load may become detached.

[0025] Other elements required for both supplying the electromagnetic plate (2) electrically, and the rotor (5.1) and the hydraulic cylinders (4) hydraulically, may also be arranged in the interior of the central body (1), for example a central tube (6) through the interior of which are channelled the hoses of the hydraulic system (not shown in the figures) to the rotor (5.1), a distributor (7) which supplies the oil-hydraulic fluid to each of the hydraulic cylinders (4), the electric cables from the collector (5.3) to the electromagnetic plate (2), etc.

[0026] To ensure that the interior of the central body (1) is not exposed to external damage it is preferable that said central body (1) comprises removable housing plates (1.6) arranged between the pairs of radial flanges (1.1), thus covering and protecting the interior of the central body (1). Said housing plates (1.6) can be removed from the device so that maintenance or repair work can be carried out on the elements housed in the interior space of the central body (1).

[0027] On the other hand it is preferable for the lower ends (1.12) of the pairs of radial flanges (1.1) to form external vertical slots (1.5) which act as a stop for several lower clampling projections (3.1) of the hydraulic cylinders (4) to the radial blades (3). The lower end of the hydraulic cylinders (4) should preferably be fixed to the projections (3.1) of the radial blades (3) by means of a second pin (3.2).

[0028] In addition it is preferable for the external vertical slots (1.5) to comprise several reinforcing parts (1.6) for the stop of the lower clamping projections (3.1). These reinforcing parts (1.6) may be fixed, for example, to the outside of the vertical slots (1.5), thus increasing the area of contact of the edge of the slots (1.5) as a stop for the lower clamping projections (3.1) when the radial blades (3) are in their most open position, see Figure 2.

[0029] Similarly, it is preferable for the hydraulic cylinders (4) to comprise an external protection formed by a removable tube (4.1). The removable tube (4.1) is arranged in the lower portion of the hydraulic cylinders (4), thus protecting their stems when the radial blades (3) are in their most closed position, see Figure 1.

Claims

1. A device for collecting ferrous materials, which comprises a central body (1) fixed to an electromagnetic plate (2), wherein a plurality of radial blades (3) actuated by several hydraulic cylinders (4) arranged between each radial blade (3) and the central body (1) pivots on the edge of the electromagnetic plate (2) and wherein the central body (1) is fixed to a rotary mechanism (5) capable of rotating the device about the vertical axis of the hook of lifting equipment, **characterised in that** the central body (1) comprises a plurality of pairs of radial flanges (1.1) between which are arranged the hydraulic cylinders (4), wherein upper ends (1.11) of the pairs of radial flanges (1.1) are fixed to an upper cylindrical ring (1.2) for coupling to the rotary mechanism (5), and lower ends (1.12) of the pairs of radial flanges (1.1) are fixed to the upper face of the electromagnetic plate (2), the rotary mechanism (5) being arranged in the interior of the central body (1).

2. The device according to Claim 1, wherein the upper ends (1.11) of the pairs of radial flanges (1.1) form upper clamping projections (1.4) of the hydraulic cylinders (4) to the central body 1).

3. The device according to Claim 1, wherein the lower ends (1.12) of the pairs of flanges (1.1) form external vertical slots (1.1) which act as a stop for several lower clamping projections (3.1) of the hydraulic cylinders (4) to the radial blades (3).

4. The device according to Claim 3, wherein the external vertical slots (1.5) comprise several reinforcing parts (1.6) for the stop of the lower clamping projections (3.1).

5. The device according to Claim 1, wherein the rotary mechanism (5) comprises a hydraulic rotor (5.1) which is fixed to the upper cylindrical ring (1.2) of the central body (1) by means of a clamping flange (5.2).

6. The device according to Claims 1 or 5, wherein the rotary mechanism (5) comprises an electric collector (5.3) which guarantees the continuity of the electricity supply to the electromagnetic plate (2) during its 360° rotation both in one direction and the other.

7. The device according to Claim 1, wherein the central body (1) comprises removable housing plates (1.6) arranged between the pairs of radial flanges (1.1), thereby covering and protecting the interior of the central body (1).

8. The device according to Claim 1, wherein the hydraulic cylinders (4) comprise an external protection formed by a removable tube (4.1).

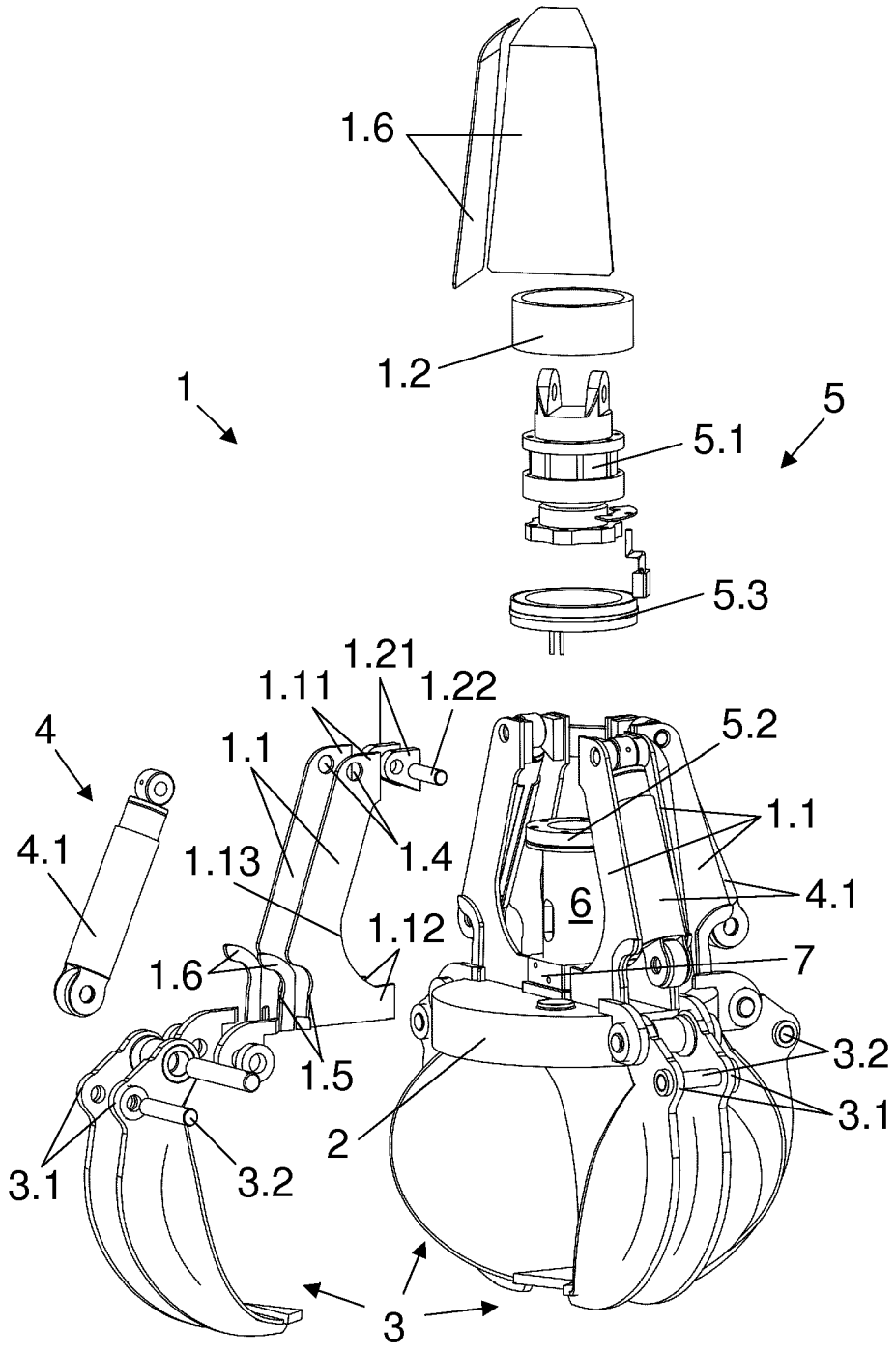
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Fig.1

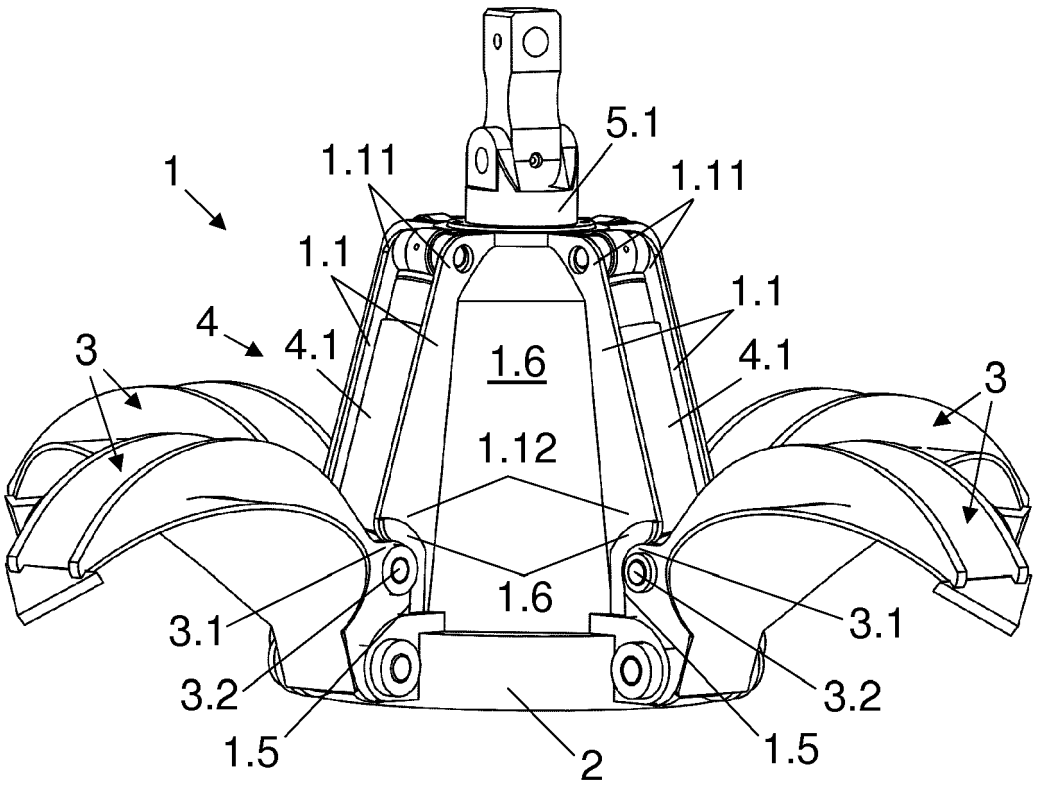

Fig.2

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EUROPEAN SEARCH REPORT

Application Number
EP 14 38 2279

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 20 2012 100579 U1 (TSAI CHING HUI [TW]) 16 March 2012 (2012-03-16) * the whole document *	1	INV. B66C3/04 B66C3/16
A	US 6 168 219 B1 (FUTA DAVID [US]) 2 January 2001 (2001-01-02) * the whole document *	1	
A	JP S61 154286 U (UNKNOWN) 25 September 1986 (1986-09-25) * figures *	1	

TECHNICAL FIELDS SEARCHED (IPC)

B66C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	26 November 2014	Verheul, Omiros

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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26-11-2014

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82