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

(11) EP 2 952 848 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
25.01.2017 Bulletin 2017/04

(21) Application number: **15169095.5**

(22) Date of filing: **26.05.2015**

(51) Int Cl.:
F42D 5/045 *(2006.01)* *F42D 5/04* *(2006.01)*

(54) **A BLAST-RESISTANT CONTAINER**

EXPLOSIONSSICHERER BEHÄLTER

RÉCIPIENT RÉSISTANT AUX EXPLOSIONS

(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

(30) Priority: **02.06.2014 PL 40839414**

(43) Date of publication of application:
09.12.2015 Bulletin 2015/50

(73) Proprietor: **Wojskowy Instytut Techniki Inzynieryjnej im. profesora Jozefa Kosackiego**
50-961 Wroclaw (PL)

(72) Inventors:
- **Czubaty, Lukasz**
  15-198 Bialystok (PL)
- **Jasinski, Wieslaw**
  55-093 Kielczow (PL)
- **Juzwiak, Piotr**
  53-206 Wroclaw (PL)
- **Krysiak, Piotr**
  42-141 Przystajn (PL)
- **Ludas, Michal**
  53-652 Wroclaw (PL)
- **Sliwinski, Janusz**
  50-540 Wroclaw (PL)
- **Wojciechowski, Andrzej**
  53-226 Wroclaw (PL)
- **Szczepaniak, Marcin**
  55-093 Kielczow (PL)

(74) Representative: **Eupatent.pl**
ul. Zeligowskiego 3/5
90-752 Lodz (PL)

(56) References cited:
WO-A1-2005/085746
DE-A1- 2 628 547
GB-A- 2 378 382
US-A- 3 721 201
US-A- 3 820 479
US-B1- 6 289 816
US-B1- 8 413 564

EP 2 952 848 B1

Printed by Jouve, 75001 PARIS (FR)

Description

TECHNICAL FIELD

[0001] The invention relates to a blast-resistant container for transporting and storing products containing an explosive material.

BACKGROUND

[0002] Typical blast-resistant containers have a housing with a lid and legs. Inside the container there is a recess for products containing explosives, which is surrounded by a layer for damping explosion energy. The layer for damping explosion energy may comprise sand, sawdust or plastic bottles filled with water.

[0003] r US3721201 A, which forms a starting point for the independent claim 1, discloses a blast-resistant container comprising a housing with a lid wherein the housing has a recess defined by first boards and a floor; wherein the recess is surrounded by non-flammable liquid; wherein the lid is rotatable attached to the housing via an axle so that the plane of rotation of the lid with respect to the housing is parallel to the floor; and wherein the lid is round.

[0004] Patent document US6289816 discloses a water-based apparatus for mitigating the gas pressure loading and associated damage and injuries from a fully or partially confined explosion. The water-based apparatus comprises an inner recess which is surrounded by plastic containers with non-flammable liquid, said circle of plastic containers being surrounded by the outer wall of the apparatus.

SUMMARY

[0005] The invention relates to a blast-resistant container according to the appended claims.

BRIEF DESCRIPTION OF DRAWINGS

[0006] Further details and features of the present invention, its nature and various advantages will become more apparent from the following detailed description of the preferred embodiments shown in a drawing, in which:

Fig. 1 shows the blast-resistant container in the front view;
Fig. 2 shows the container in a top view;
Fig. 3 shows the container in the cross-section B-B of Fig. 2;
Fig. 4 shows the container in the cross-section CC of Fig. 2; and
Fig. 5 shows the container in the cross-section A-A of Fig. 1.

DETAILED DESCRIPTION

[0007] The blast-resistance container comprises a housing 1 in form of a tube ended with a bottom 2, to which assembly legs 3 are attached. Clamping rings 4 are mounted in an upper part of the housing 1, on its periphery, in which eye bolts 5 with nuts 6, a lower housing 7 of the axle, transport couplings 8 and a retaining support 9 are mounted. Fasteners for a protective cover cord are attached in a middle part. The housing 1 is closed from the top with a container lid 11 which comprises an upper ring 12, a lower ring 13 and ribs 14. Both the upper ring 12 and the lower ring 13 comprise rods 15 passing through ribs 14. The rods 15 of the upper ring 12 are mounted between the rods 15 of the lower ring 13 at the level of gaps between the rods 15 of the lower ring. In other words, the rods 15 of the upper ring 12 are aligned above the empty spaces created between the rods 15 of the lower ring 13, as seen in Fig. 4. The upper housing 16 of the axle, brackets for eye bolts 17 and the handle 18 are mounted to the container lid 11. The container lid 11 is connected rotationally with the housing 1 by means of the axle 19, which is placed in the lower housing 7 of the axle and the upper housing 16 of the axle. The axle 19 has threaded ends onto which the back nut 20 and the securing nut 21 are screwed. The (thick) second boards 22 are placed in the housing 1 and are rested against a floor 23. The floor 23 is mounted to the bottom supports 24. On the floor 23, between the second boards 22 and the stops 25, there are placed plastic bottles with water 26 (or other non-flammable liquid). A recess 27, made of first boards 28 and comprising a cover 29 and a shelf 30, is placed inside the housing 1 in its middle part. The second boards 22 may be thicker than first boards 28.

[0008] The container can be prepared for operation as follows. First, the nuts 6 of eye bolts 5 are partially unscrewed and the eye bolts 5 are tilted back. Then, the nut back 20 is unscrewed and the container lid 11 is raised. The raised container lid 11 should be manually rotated about the axis 19 by means of the handle 18 for the container to be opened. Next, the lid 29 is removed from the recess 27 and products containing explosives can be placed on the shelf 30. When the products are placed on the shelf, the recess 27 is closed with the lid 29. After this, the container lid 11 should be turned to the original position and pressed to the housing 1 by means of the nuts 6 of eye bolts 5. The container prepared in such a manner is ready for use.

[0009] The advantage of the container according to the invention is a simple and cheap construction of the container interior, which is made of easily obtainable wooden materials. Another advantage is that, after the detonation of the explosive contained in products stored in the container, the container internal parts can be easily and quickly replaced without using any special tools.

Claims

1. A blast-resistant container comprising a housing (1) with a lid (11), wherein

   - the housing (1) has a recess (27) defined by first boards (28), a floor (23) and a cover (29);
   - wherein the recess (27) is surrounded by stops (25), plastic containers with non-flammable liquid (26) and second boards (22);
   - wherein the stops (25) and the second boards (22) are arranged to define a space in which plastic containers with non-flammable liquid (26) are placed;
   - and wherein the second boards are positioned adjacent to the side walls of the housing (1);
   - wherein the lid (11) is rotatably attached to the housing (1) via an axle (19) so that the plane of rotation of the lid (11) with respect to the housing (1) is parallel to the floor (23);

   and wherein the housing (1) comprises a tubular side wall, which comprises a clamping ring (4), to which eye bolts (5) are pivotally attached substantially evenly along the circumference of the housing's (1) side wall; and wherein the lid (11) is round and comprises brackets (17) for eye bolts (5) so that the eye bolts (5) can be releasably secured in these brackets (17) using nuts (6), thereby allowing to lock the housing (1) with the lid (11).

2. The blast-resistant container according to claim 1, wherein the lid (11) comprises an upper ring (12), a lower ring (13) and wherein the upper ring (12) and the lower ring (13) comprise rods (15) arranged so that the rods (15) of the upper ring (12) are aligned above the empty spaces created between the rods (15) of the lower ring (13).

3. The blast-resistant container according to claim 2, wherein the lid (11) comprises ribs (14) secured in the upper ring (12) and the lower ring (13), so that the rods (15) of the upper ring (12) and the lower ring (13) traverse through the ribs (14).

4. The blast-resistant container according to claim 3, wherein the rods (15) are straight and are aligned perpendicularly with respect to the ribs (14).

5. The blast-resistant container according to any of previous claims, wherein the non-flammable liquid in containers (26) is water.

Patentansprüche

1. Explosionssicherer Behälter, der ein Gehäuse (1) mit einem Deckel (11) umfasst, wobei

   - das Gehäuse (1) eine Aussparung (27) aufweist, die durch erste Platten (28), einen Boden (23) und eine Abdeckung (29) definiert wird;
   - wobei die Aussparung (27) von Sperren (25), Plastikbehältern mit einer nicht brennbaren Flüssigkeit (26) und zweiten Platten (22) umgeben ist;
   - wobei die Sperren (25) und die zweiten Platten (22) angeordnet sind, um einen Raum zu definieren, in den Plastikbehälter mit einer nicht brennbaren Flüssigkeit (26) platziert werden;
   - und wobei die zweiten Platten neben den Seitenwänden des Gehäuses (1) positioniert sind;
   - wobei der Deckel (11) rotierbar am Gehäuse (1) mittels einer Achse (19) angebracht ist, sodass die Rotationsebene des Deckels (11) in Bezug auf das Gehäuse (1) parallel zum Boden (23) ist;

   und wobei das Gehäuse (1) eine röhrenförmige Seitenwand umfasst, die einen Spannring (4) umfasst, an dem Ringschrauben (5) im Wesentlichen eben entlang des Umfangs der Seitenwand des Gehäuses (1) schwenkbar angebracht sind; und wobei der Deckel (11) rund ist und Klammern (17) für Ringschrauben (5) umfasst, sodass die Ringschrauben (5) in diesen Klammern (17) durch Verwenden von Muttern (6) lösbar befestigt werden können, wobei es dadurch ermöglicht wird, das Gehäuse (1) mit dem Deckel (11) zu verschließen.

2. Explosionssicherer Behälter nach Anspruch 1, wobei der Deckel (11) einen oberen Ring (12), einen unteren Ring (13) umfasst, und wobei der obere Ring (12) und der untere Ring (13) Stäbe (15) umfassen, die so angeordnet sind, dass die Stäbe (15) des oberen Rings (12) oberhalb der Leerräume ausgerichtet sind, die zwischen den Stäben (15) des unteren Rings (13) geschaffen werden.

3. Explosionssicherer Behälter nach Anspruch 2, wobei der Deckel (11) Rippen (14) umfasst, die im oberen Ring (12) und im unteren Ring (13) befestigt sind, sodass die Stäbe (15) des oberen Rings (12) und des unteren Rings (13) quer durch die Rippen (14) verlaufen.

4. Explosionssicherer Behälter nach Anspruch 3, wobei die Stäbe (15) gerade sind und senkrecht in Bezug auf die Rippen (14) angeordnet sind.

5. Explosionssicherer Behälter nach einem der vorhergehenden Ansprüche, wobei die nicht brennbare Flüssigkeit in den Behältern (26) Wasser ist.

Revendications

1. Contenant résistant aux explosions comprenant un boîtier (1) pourvu d'un couvercle (11), dans lequel

- le boîtier (1) comporte un logement (27) défini par des premiers panneaux (28), une base (23) et un couvercle supérieur (29) ;
- dans lequel le logement (27) est entouré de cales (25), de contenants en plastique remplis de liquide ininflammable (26) et de seconds panneaux (22) ;
- dans lequel les cales (25) et les seconds panneaux (22) sont disposés pour définir un espace dans lequel sont placés des contenants en plastique remplis de liquide ininflammable (26) ;
- et dans lequel les seconds panneaux sont positionnés adjacents aux parois latérales du boîtier (1) ;
- dans lequel le couvercle (11) est fixé rotatif au boîtier (1) par le biais d'un axe (19) de sorte que le plan de rotation du couvercle (11) par rapport au boîtier (1) soit parallèle à la base (23) ;

et dans lequel le boîtier (1) comprend une paroi latérale tubulaire comprenant une bride de serrage (4), à laquelle des vis à oeil (5) sont fixées pivotantes sensiblement régulièrement sur la circonférence de la paroi latérale du boîtier (1) ; et dans lequel le couvercle (11) est rond et comprend des supports (17) destinés aux vis à oeil (5), de sorte que les vis à oeil (5) puissent être fixées de manière libérable dans lesdits supports (17) au moyen d'écrous (6), permettant ainsi de verrouiller le couvercle (11) au boîtier (1).

2. Contenant résistant aux explosions selon la revendication 1, dans lequel le couvercle (11) comprend une bride supérieure (12), une bride inférieure (13) et dans lequel la bride supérieure (12) et la bride inférieure (13) comprennent des tiges (15) disposées de sorte que les tiges (15) de la bride supérieure (12) soient alignées au-dessus des espaces vides créés entre les tiges (15) de la bride inférieure (13).

3. Contenant résistant aux explosions selon la revendication 2, dans lequel le couvercle (11) comprend des nervures (14) fixées dans la bride supérieure (12) et dans la bride inférieure (13), de sorte que les tiges (15) de la bride supérieure (12) et de la bride inférieure (13) traversent les nervures (14).

4. Contenant résistant aux explosions selon la revendication 3, dans lequel les tiges (15) sont droites et sont alignées perpendiculairement aux nervures (14).

5. Contenant résistant aux explosions selon l'une quelconque des revendications précédentes, dans lequel le liquide ininflammable remplissant les contenants (26) est de l'eau.

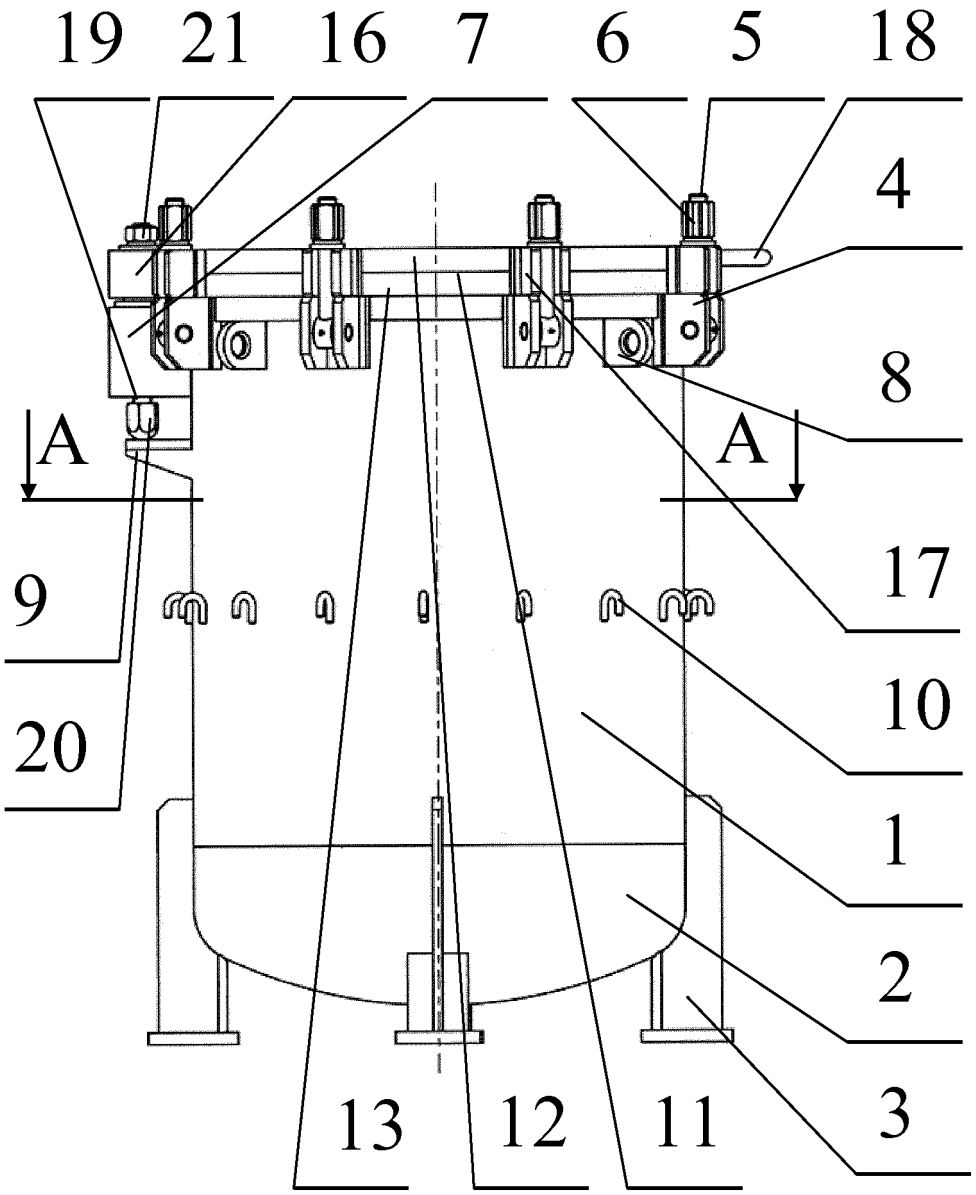

Fig.1

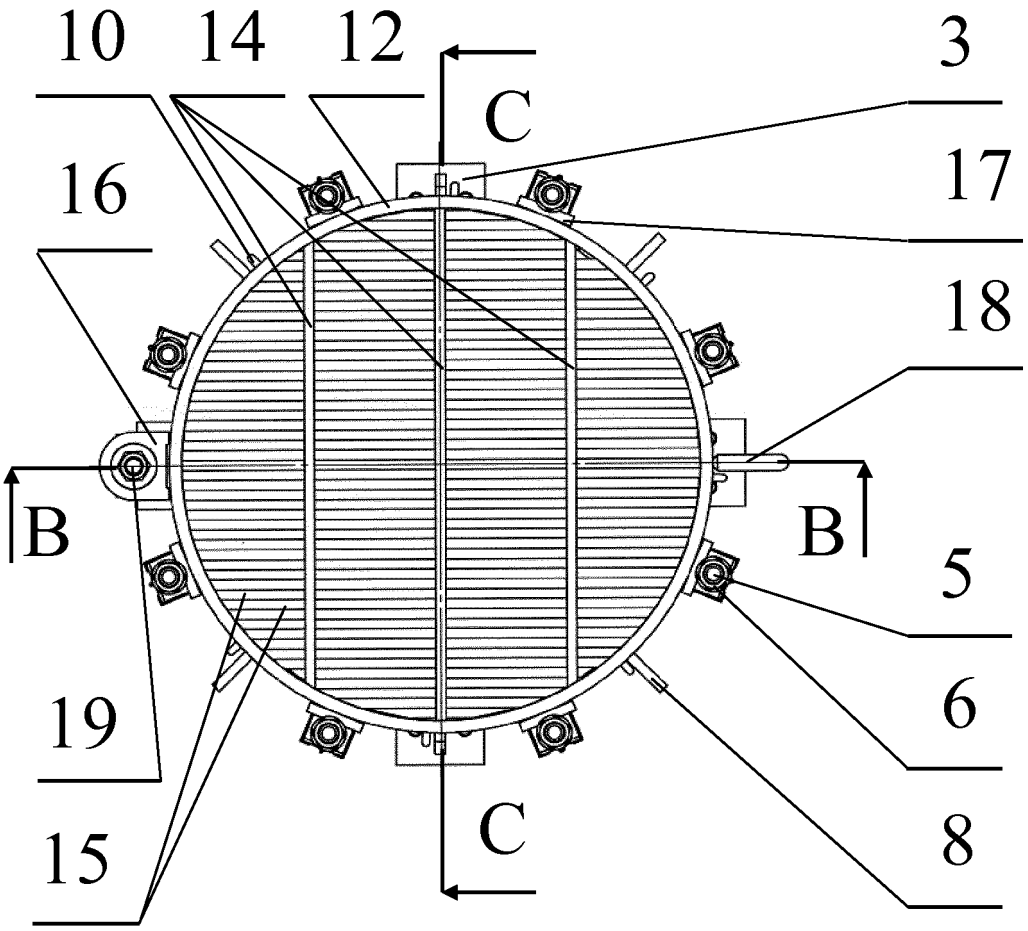

Fig.2

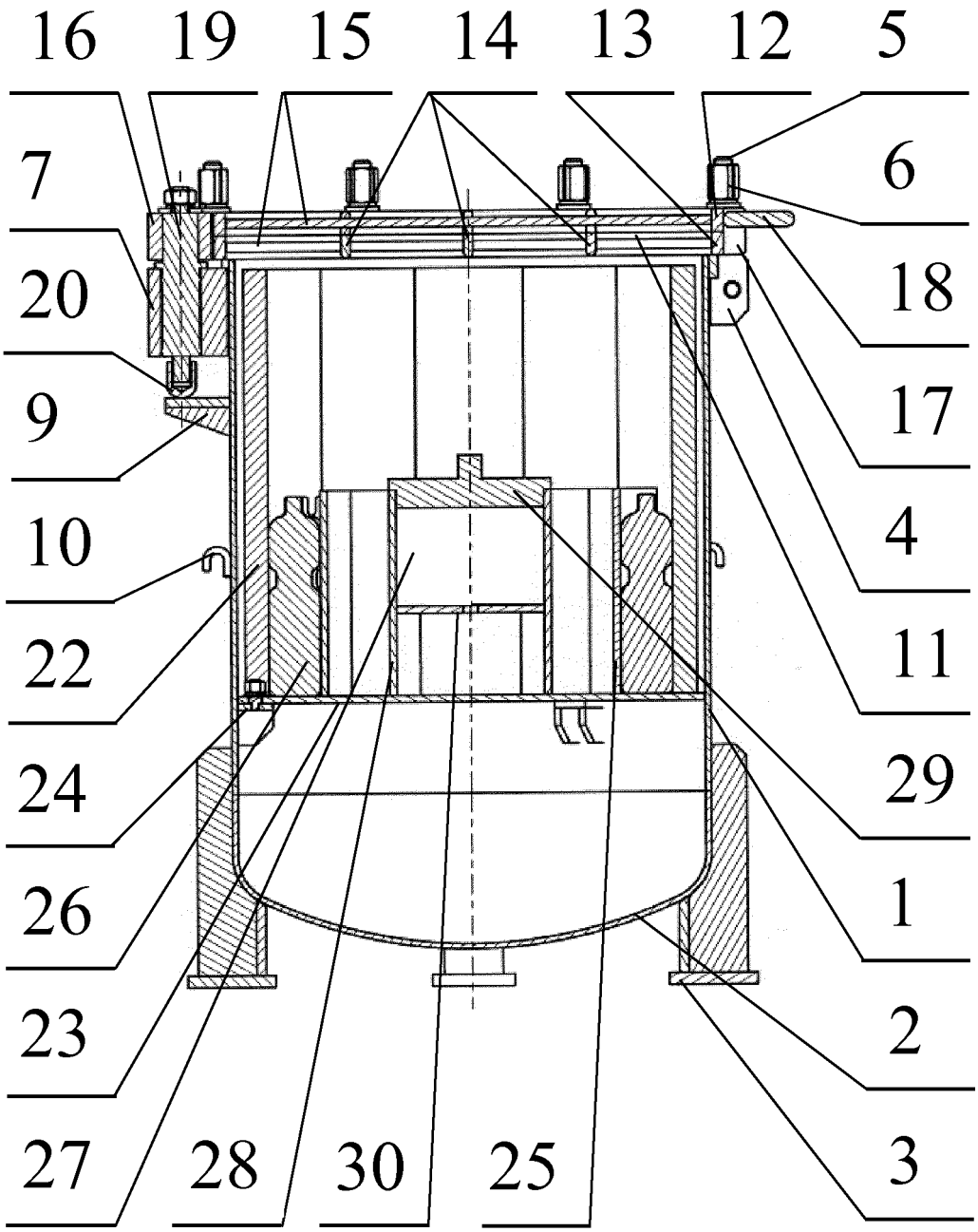

Fig.3

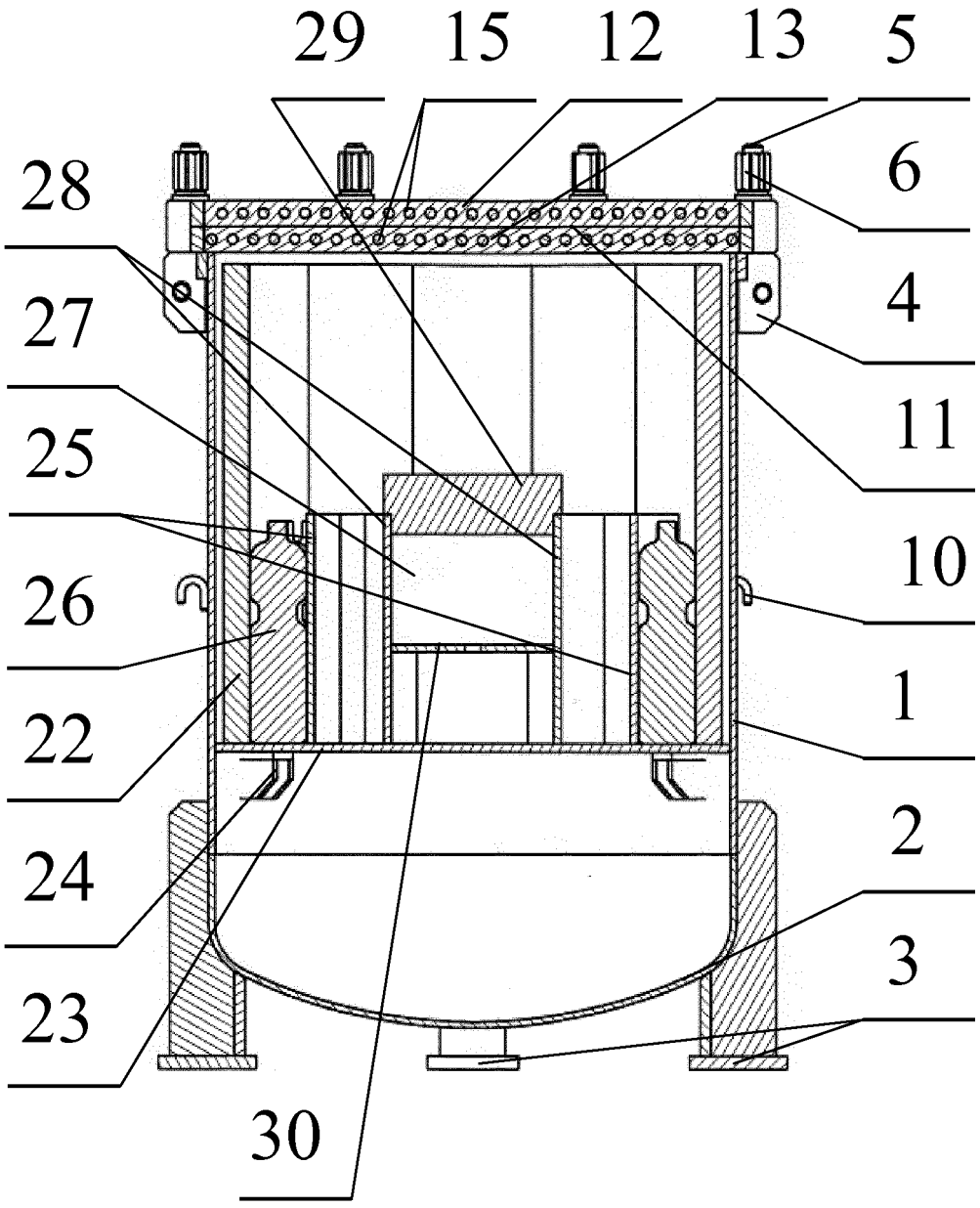

Fig.4

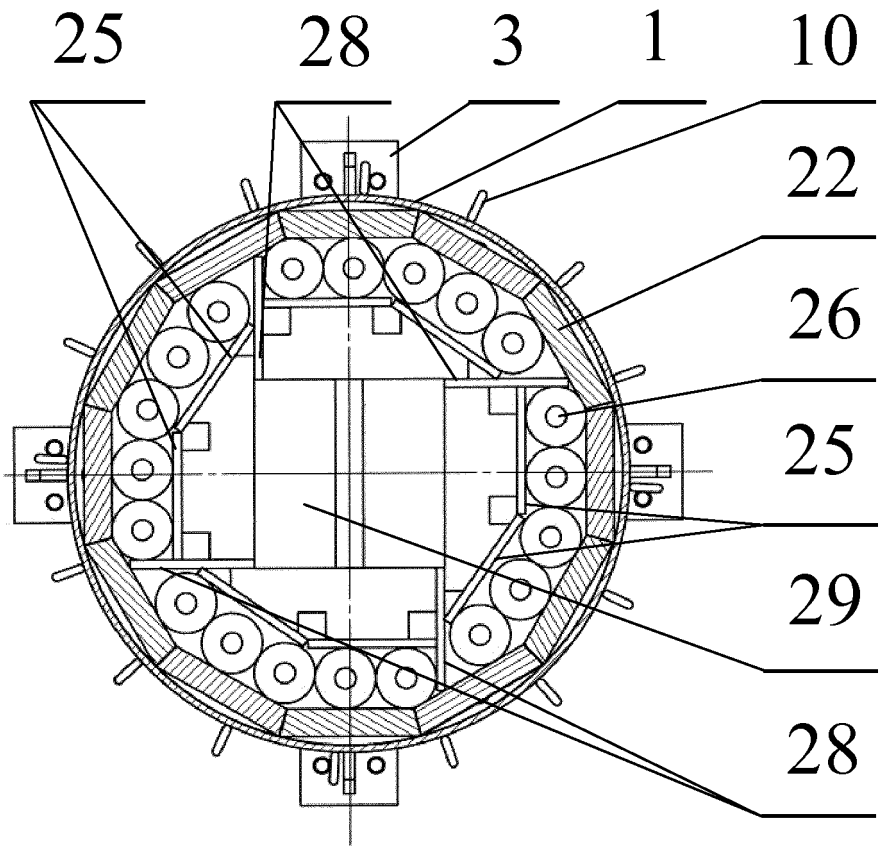

Fig.5

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 3721201 A **[0003]**
- US 6289816 B **[0004]**