(19) Europäisches Patentamt
European Patent Office
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(11) **EP 2 937 662 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
28.10.2015 Bulletin 2015/44

(51) Int Cl.:
F41H 11/14 *(2006.01)*

(21) Application number: **15163825.1**

(22) Date of filing: **16.04.2015**

(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
Designated Validation States:
MA

(30) Priority: **18.04.2014 PL 40794314**

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(54) **MINE-CLEARING SYSTEM**

(57) A mine-clearing system comprising: a launcher, an explosive part of a charge with a fuse and a braking spring, characterized in that to a bottom (2) of the launcher (1) there are attached: a container (3) comprising an igniting head (4) and a powder ballast (5); and brackets (6), which are connected pivotally with a mount (7) having road wheels (8).

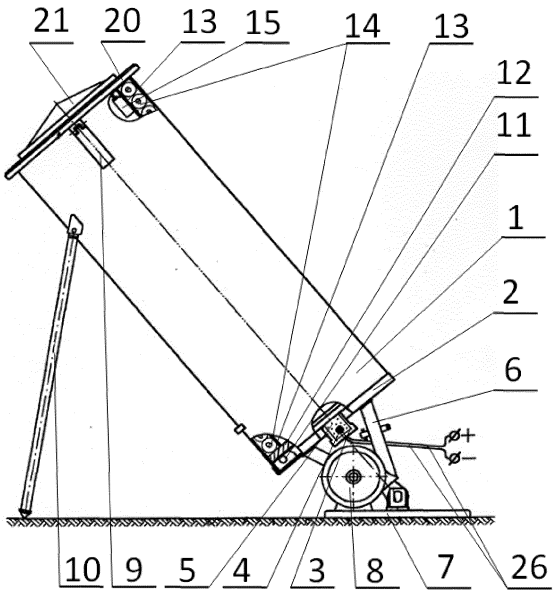

Fig. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to an explosive charge for destruction of mines and barbed wire barriers in the minefield.

BACKGROUND

[0002] There are known mine-clearing systems, for example POMINS II by Israel Military Industries Ltd. (Ramat Hasharon, Israel) comprising a launcher with a rocket engine, an explosive part of a line charge and two lines with attached spherical concentrated charges. The fuse is mounted to one side of the flexible explosive part and a braking rod is mounted to its other side.

[0003] There is a need to provide an effective mine neutralization system that has a quiet operation, as well as a simple construction.

SUMMARY

[0004] There is presented herein a mine-clearing system comprising: a launcher, an explosive part of a charge with a fuse and a braking spring, characterized in that to a bottom of the launcher there are attached: a container comprising an igniting head and a powder ballast; and brackets, which are connected pivotally with a mount having road wheels.

[0005] Preferably, the handling grips and launcher supporting grips are placed in the upper part of the launcher.

[0006] Preferably, the launcher comprises a braking spring, which is attached to the bottom at one end and to the piston at the other end, and a reel leaned against the piston, wherein the reel comprises helically wound explosive part of the charge ended with the fuse attached to the reel.

[0007] Preferably, the explosive part of the charge comprises detonating wires, on which there are placed concentrated explosive charges with hollows, wherein the concentrated explosive charges are separated by means of flexible tubes.

[0008] Preferably, the fuse comprises an electric delayed action initiator, which is placed in a booster separated from the detonating wires by a partition, and a spring.

[0009] Preferably, the partition is connected with the piston by a flexible rod.

[0010] In a preferable embodiment of the mine-clearing system presented herein, a container with an igniting head and a powder ballast, as well as brackets connected with a mount on wheels, are fixed to a bottom of a launcher. Handling grips and grips supporting the launcher are in the upper part of the launcher. There is a braking spring located in the launcher, which is mounted to the bottom with one end and to the piston with other end. The reel, with helically wound part of the explosive charge with the fuse mounted to the reel, is leaned against the piston. The explosive part of the charge contains detonating wires, on which there are placed the concentrated explosive charges with hollows, separated by flexible tubes. The fuse has an electric delayed action initiator, which is placed in a booster separated from the detonating wires by a partition and a spring. The partition is connected with the piston by a flexible pull rod.

BRIEF DESCRIPTION OF DRAWINGS

[0011] The mine-clearing system is presented by means of exemplary embodiment on a drawing, in which;

Fig. 1 shows the charge when unfolded, in a side view;
Fig. 2 shows section of explosive part in an isometric view;
Fig. 3 shows the fuse in longitudinal section in secured position;
Fig. 4 shows the fuse in longitudinal section in armed position.

DETAILED DESCRIPTION

[0012] Figs. 1-4 present an example embodiment of the mine-clearing system.

[0013] The mine-clearing system comprises a launcher 1 with a bottom 2. To the middle part of the bottom 2 there is mounted a container 3 with an igniting head 4 and a powder ballast 5, as well as three brackets 6. The launcher 1 is connected pivotally, via supports 6, with a mount 7. The mount 7 has road wheels 8. In the upper part of the launcher 1 there are mounted handling grips 9 and grips 10 supporting the launcher. Inside the launcher 1, in its lower part, there is a braking spring 11, which is attached to the bottom 2 with one end and to the piston 12 with the other end. A reel 13, with helically wound part of the explosive charge 14 attached to the reel 13 and comprising a fuse 15, is leaned against the piston 12. The explosive part of the charge 14 comprises detonating wires 16 on which there are placed concentrated explosive charges 17 with hollows 18. The concentrated explosive charges 17 are separated by flexible tubes 19. The reel 13 ends with a flange 20 and a conic cover 21. The fuse 15 has electric delayed action initiator 22, which is placed in a booster 23 pressed down to a partition 24 by means of a spring 25. The electric delayed action initiator 22 is connected in series with the initiating head 4 from which there are output electrical wires 26. A flexible rod 27 is attached to the partition 24 with one end, wherein the second end is attached to the piston 12. The partition 24 is protected from moving out by means of plates 28.

[0014] The principle of operation of the mine-clearing system is as follows: the system is placed on the ground in the operating configuration and connected with electric wires 26 of the outer power source. Supplying an elec-

trical pulse to the igniting head 4 causes burning of the powder ballast 5 and production of exhaust gases, which by acting on the piston 12 cause its ejection together with the reel 13 with helically wound part of the explosive charge 14. At the same time, the powder train of the electric delayed action initiator 22 is set on fire. The piston 12 is stopped during the flight by the braking spring 11. This causes unreeling of the explosive part of the charge 14 from the reel 13, pulling out the partition 24 and pressing down of the booster 23 to the detonating wires 16 by the spring 25. When the explosive part of the charge 14 falls to the ground, it detonates automatically due to the action of electric delayed action initiator 22.

[0015] The advantage of the invention is that the explosive part of the charge affects the ground with high efficiency, thanks to the hollows of the concentrated explosive charges mounted on detonating wires.

[0016] The advantage is also that there is no significant noise produced during the pyrotechnic ejection of the reel with the explosive part of the charge and its unreeling, unlike in case of operation of the rocket engine, which would expose the breached area of the minefield.

[0017] The advantage is also a simple charge construction.

Claims

1. A mine-clearing system comprising: a launcher, an explosive part of a charge with a fuse and a braking spring, **characterized in that** to a bottom (2) of the launcher (1) there are attached:

   - a container (3) comprising an igniting head (4) and a powder ballast (5);
   - and brackets (6), which are connected pivotally with a mount (7) having road wheels (8).

2. The system according to claim 1, wherein the handling grips (9) and launcher supporting grips (10) are placed in the upper part of the launcher (1).

3. The system according to any of previous claims, wherein the launcher (1) comprises a braking spring (11), which is attached to the bottom (2) at one end and to the piston (12) at the other end, and a reel (13) leaned against the piston (12), wherein the reel (13) comprises helically wound explosive part of the charge (14) ended with the fuse (15) attached to the reel (13).

4. The system according to any of previous claims, wherein the explosive part of the charge (14) comprises detonating wires (16), on which there are placed concentrated explosive charges (17) with hollows (18), wherein the concentrated explosive charges (17) are separated by means of flexible tubes (19).

5. The system according to any of previous claims, wherein the fuse (15) comprises an electric delayed action initiator (22), which is placed in a booster (23) separated from the detonating wires (16) by a partition (24), and a spring (25).

6. The system according to any of previous claims, wherein the partition (24) is connected with the piston (12) by a flexible rod (27).

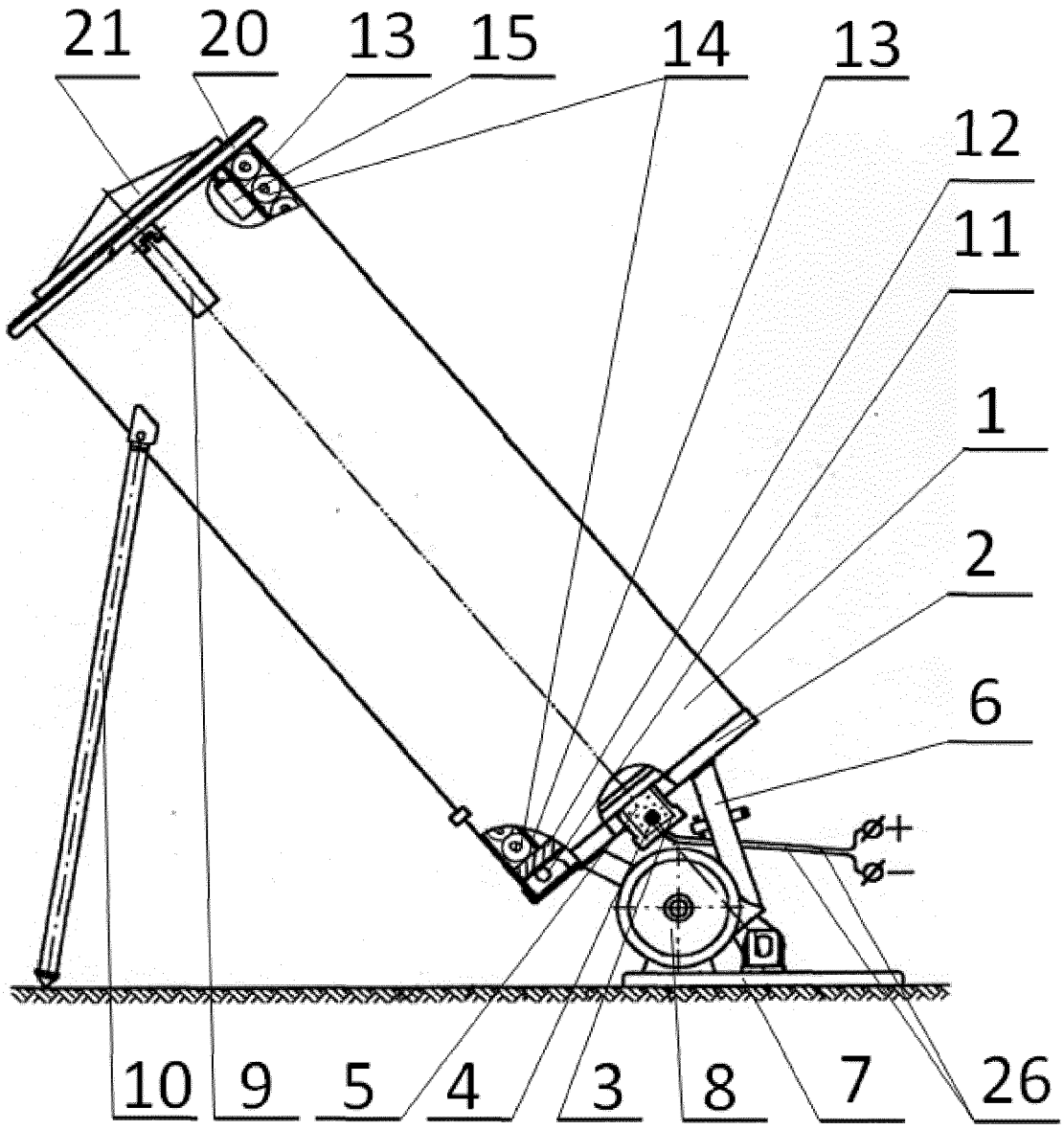

Fig. 1

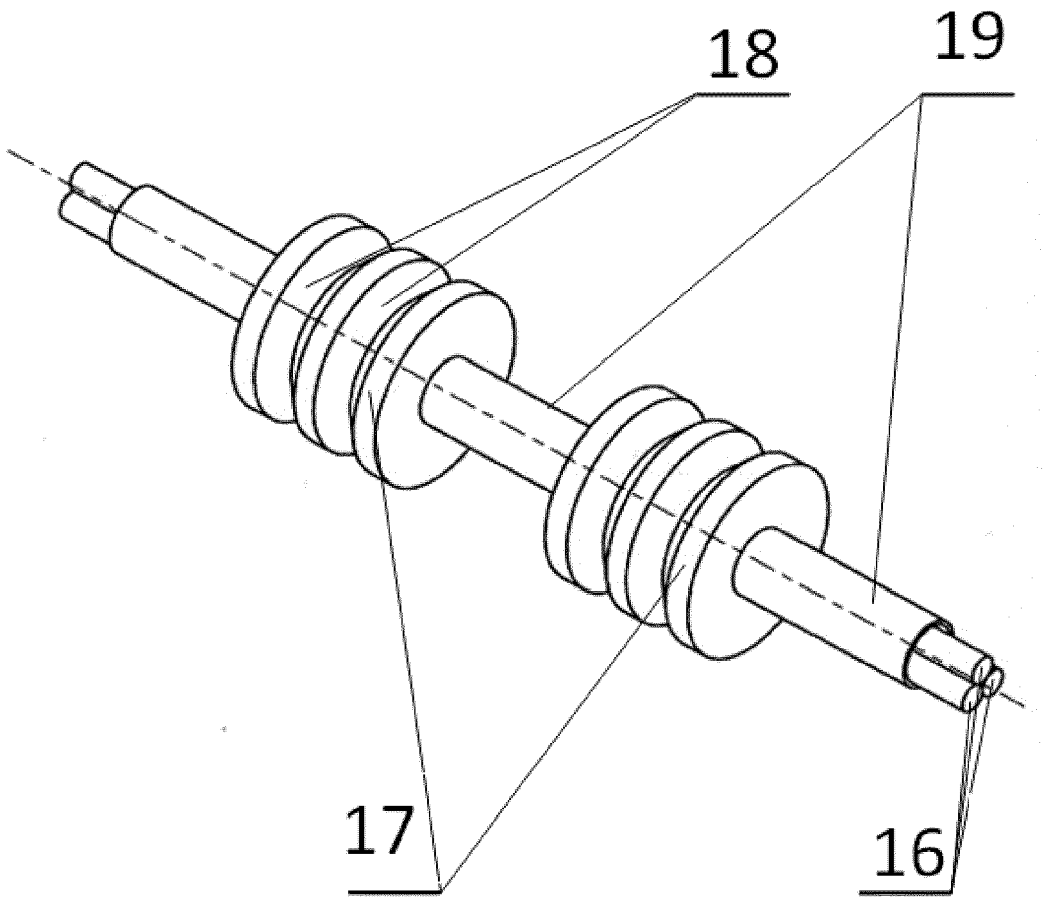

Fig.2

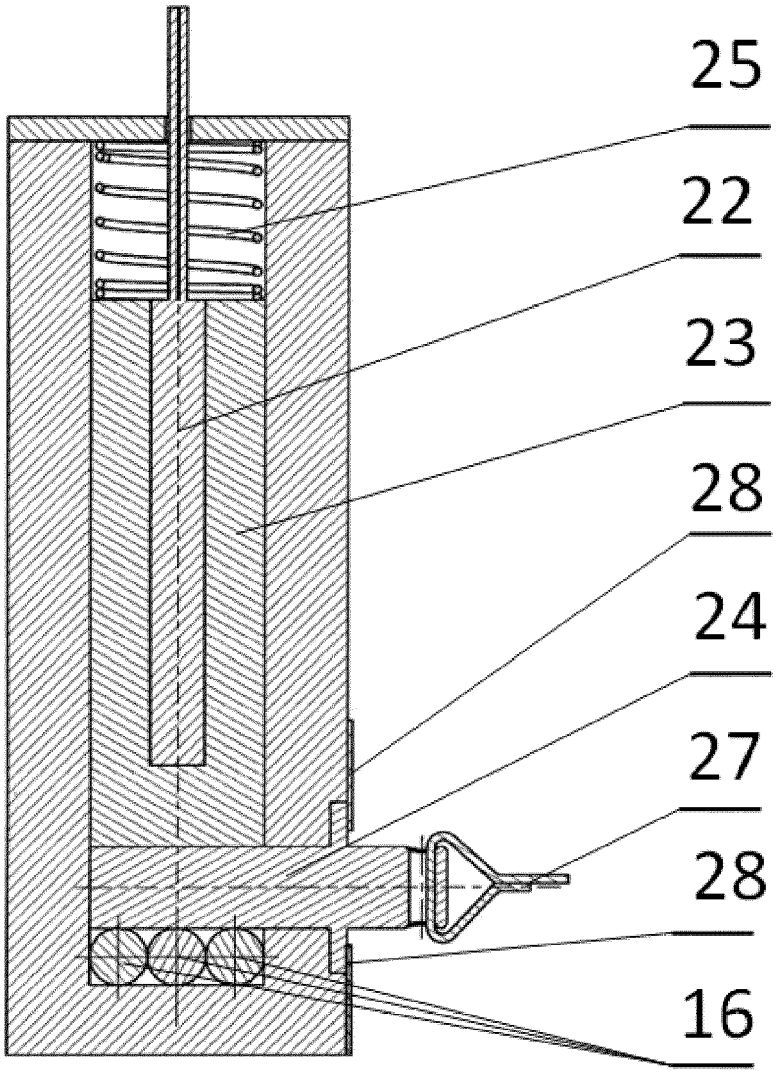

Fig.3

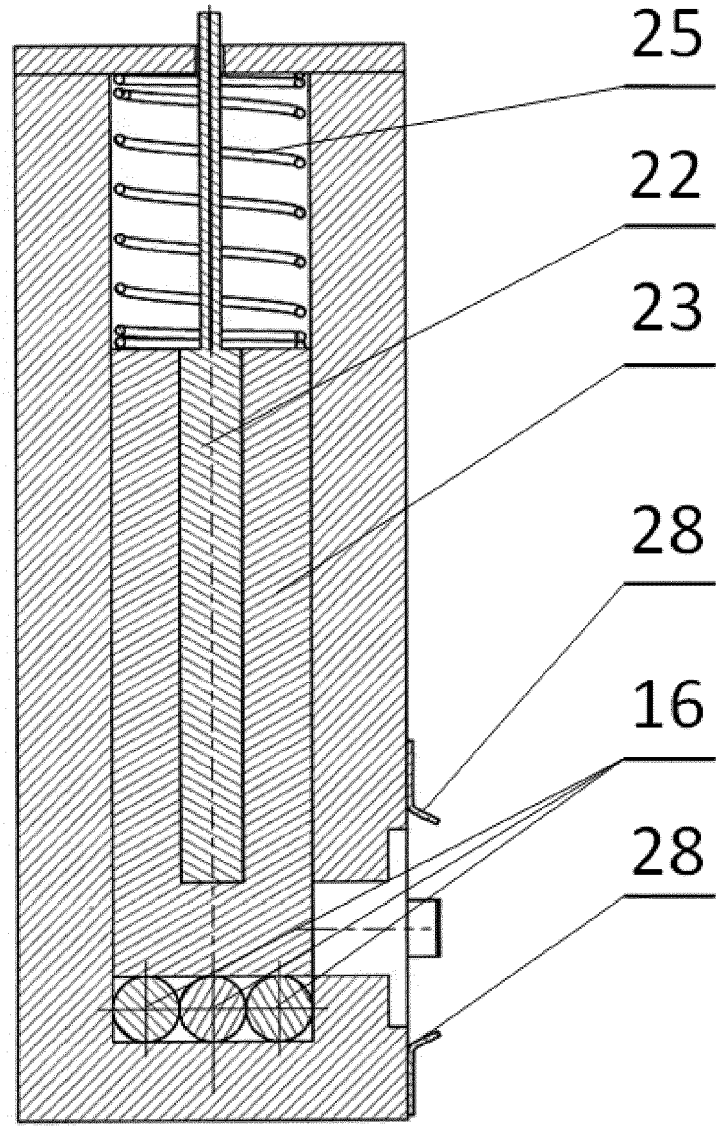

Fig.4

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EUROPEAN SEARCH REPORT

Application Number
EP 15 16 3825

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	"POMINS Portable Mine Neutralization System", , 22 August 2003 (2003-08-22), XP002744297, Retrieved from the Internet: URL:https://web.archive.org/web/20030822004849/http://mines.h1.ru/weapons/mines/pomins/Pomins.html [retrieved on 2015-09-10] * the whole document *	1-6	INV. F41H11/14
A	US 6 415 717 B1 (SANFORD MATTHEW J [US] ET AL) 9 July 2002 (2002-07-09) * column 3, lines 10-47 * * figures 1-2 *	1-6	
A	US 4 683 797 A (WITTBRODT DONALD R [US]) 4 August 1987 (1987-08-04)	1-6	
A	DE 299 22 893 U1 (COMET PYROTECH [DE]) 6 April 2000 (2000-04-06)	1-6	TECHNICAL FIELDS SEARCHED (IPC)
A	WO 00/71964 A1 (BRISANT TECHNOLOGIES INTERNAT [US]) 30 November 2000 (2000-11-30)	1-6	F41H F42B F41F
A	FR 1 270 211 A (BOFORS AB) 25 August 1961 (1961-08-25)	1-6	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	10 September 2015	Menier, Renan

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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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6415717 B1	09-07-2002	NONE	
US 4683797 A	04-08-1987	NONE	
DE 29922893 U1	06-04-2000	NONE	
WO 0071964 A1	30-11-2000	AU 7050200 A	12-12-2000
		CA 2337237 A1	30-11-2000
		EP 1097350 A1	09-05-2001
		WO 0071964 A1	30-11-2000
FR 1270211 A	25-08-1961	NONE	

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