

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
18 November 2010 (18.11.2010)

PCT

(10) International Publication Number
WO 2010/130232 A2

(51) International Patent Classification: Not classified

(21) International Application Number:
PCT/CZ2010/000060

(22) International Filing Date:
12 May 2010 (12.05.2010)

(25) Filing Language: Czech

(26) Publication Language: English

(30) Priority Data:
PUV2009-21204 14 May 2009 (14.05.2009) CZ

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,

HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))
- of inventorship (Rule 4.17(iv))

Published:

- without international search report and to be republished upon receipt of that report (Rule 48.2(g))

(54) Title: DEVICE FOR SMELTING EXPLOSIVE FILLING, ESPECIALLY TNT, FROM MILITARY AMMUNITION, ESPECIALLY FROM MINES, MISSILES AND ARTILLERY GRENADES

(57) Abstract: The invention relates to the device for smelting the explosive filling, especially TNT, from military ammunition, especially from mines, missiles and artillery grenades, which comprises a heating means of processed ammunition assigned to the transport route of the processed ammunition, at the same time the heating means is formed of at least one infrared heater (3) directed to the transport route of the processed ammunition.



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Device for smelting explosive filling, especially TNT, from military ammunition, especially from mines, missiles and artillery grenades.

5 Technical field

The invention relates to the device for smelting the explosive filling, especially TNT, from military ammunition, especially from mines, missiles and artillery grenades, which comprises a heating means of processed ammunition transported on the transport route.

10

Background art

Upon smelting of an explosive filling, especially TNT, from military ammunition, especially from mines, missiles and artillery grenades is the explosive filling liquefied by heat, when the body of ammunition is heated
15 together with explosive filling, e.g. artillery grenade separated from the cartridge. The explosive filling is liquefied through heating and then it flows itself from the body of the grenade, which is turned by its bottom up, into the prepared vessel.

The known solution of this process consists in that, the grenades
20 separated from cartridges are placed on the trolley on rails in several rows and are positioned with their outlet opening of the explosive filling in direction downwards a grate, while under the grate is positioned the vessel, into which flows liquefied explosive filling after the liquefying. The trolley moves on rails into a specially modified space, which is heated by means of a steam, and in
25 which liquefying of explosive filling is carried out. In the heated space are positioned the steam/air heat exchangers (radiators), which are connected to a steam source from a steam boiler-room. The steam/air heat exchangers are heating the air in the specially modified space, and only from such heated air are heated the grenades with explosive filling. The explosive filling is liquefied
30 by effect of heat and flows into a prepared vessel.

The disadvantage of this embodiment is a low efficiency of liquefying the explosive filling, as warming of grenades by transfer of heat from the air is quite slow. Another disadvantage of this embodiment are high financial expenses

because production of steam in necessary quantity and temperature is considerably demanding, this without taking into account the heat loss during leading the steam from the source (boiler-room) to a specially modified space for liquefying the explosive filling.

- 5 To increase the speed of heating, it was suggested to position fans into the said specially modified space heated through steam for securing circulation of hot air, through which the circulation of hot air around the grenades is improved, thus the transfer of heat from air into grenades and their explosive filling is also improved, nevertheless the effects of such improvement are small
10 and give only little shorten of the time for liquefying the explosive filling. At the same time this minor improvement does not solve at all the issue of expensiveness of the steam heating for liquefying the explosive filling.

- The goal of the invention is to remedy or at least minimise disadvantages of the background art, especially to speed up the process of liquefying of
15 explosive filling, to increase performance of liquefying of explosive filling and to reduce costs for this process.

Principle of the invention

- The goal of the invention has been achieved through the device for
20 smelting explosive filling, especially TNT, from military ammunition, especially from mines, missiles and artillery grenades, whose principle consists in that, the heating means is formed of at least one infrared heater directed to the transport route of the processed ammunition.

- Through this solution the time of heating the explosive filling for liquefying
25 is reduced several times, the costs are reduced and higher productivity is achieved.

- The advantageous embodiments of invention are shown in independent claims and in description of exemplary embodiments, at the same time their common goal is to enhance resistance of the device as a whole against
30 unexpected situations.

According to this invention the infrared heaters are positioned in usual environment. The distance between the ammunition being radiated and the infrared heaters is always as a minimum such, that the temperature of the ammunition being radiated does not exceed the permitted value due to physical reasons. Moreover, the adjustment of direction for radiation from infrared heaters to the ammunition being radiated is preferably such that there is no direct radiation of the explosive filling, e.g. the trinitrotoluene. By application of the IR-A radiation the direct heating of vicinity from the IR-A radiation is at the same time limited or practically eliminated, so that the greatest part of energy is efficiently used for heating the ammunition and liquefying of its explosive filling.

Description of the drawing

Invention is schematically represented in the drawing.

Examples of embodiment

The device for smelting explosive filling, especially TNT, from military ammunition, especially from mines, missiles and artillery grenades comprises the rail track 5, on which the moving trolleys on rails 6 are positioned. In this example of embodiment the rail track 5 forms the transportation route of the ammunition processed. In the not represented example of embodiment the transport route is formed of other means, e.g. by a flat road (of asphalt, concrete), while the transport means of ammunition processed are the trolleys with wheels, crawler-type trolleys or of other types. Such transport route is further provided with a side guiding of trolleys in a direct direction, etc. The transport means of the processed ammunition is provided with a grate for flowing through the liquefied explosive filling, at the same time in the transport means under the grate there is positioned, mostly in a removable manner, a collecting vessel for the liquefied explosive filling.

In the represented example of embodiment along the sides of the rail track 5 at least one pair of chambers 1 is arranged, which on their side adjacent to the rail track 5 contain a transparent safety panel 2, formed e.g. by a sheet of

glass (e.g. a special safety glass) of a respective thickness. On the side exterior from the rail track 5 the chambers 1 are provided with entrance door 4.

In each chamber 1 behind the panel 2 there is positioned at least one infrared heater 3, which is directed through the panel 2 into the space of the rail track 5. The infrared heaters 3 radiate IR-A infrared radiation, i.e. radiation of wavelength from 0,78 to 1,4 micrometer. The infrared heaters 3 are connected to distributors R, which provide both for the power section of power supply of infrared heaters 3, as well as for the control section and possibly also the section of common automatization of operation of infrared heaters 3 with elements of active safety, time and temperature signalling. Infrared heaters 3 are preferably in anticorrosion embodiment, as they better resist to their own heating.

Distance of the safety panel 2 from edge of the trolley 6, or from a row of not represented grenades positioned on it, corresponds to the installed power of the infrared heater 3 or infrared heaters 3 in each chamber 1, because the temperature of grenades and especially of their explosive filling must not exceed the safe value known to a specialist.

In the represented example of embodiment along the rail track 5 there are positioned three pairs of chambers 1, while in each chamber 1 there is positioned one infrared heater 3. In the not represented example of embodiment in each chamber 1 a pair or more infrared heaters 3 are positioned.

As a further safety provision between the chambers 1 and the rail track 5 there are positioned the not represented auxiliary safety frames, which form a physical obstacle between the chambers 1 and the rail track 5, so that also in a case of trolley derailing the contact of the trolley 6 and chamber 1 or breaking of a wall 2 etc., is prevented.

In another not represented example of embodiment the infrared heaters 3 are installed above the transport route and they are directed downwards to the transport route. In another not represented example of embodiment the infrared heaters 3 are installed simultaneously along the transport route as well as above the transport route. It is thus obvious, that only a single infrared heater 3 may be used, especially at its positioning above the transport route of the

ammunition processed. Also the infrared heaters 3 installed above the transport route of the ammunition processed due to safety reasons are positioned in the chamber 1 behind the panel 2.

The device works so, that on a grate of the transport means of the
5 processed ammunition there is loaded the bottom up turned processed
ammunition, i.e. missiles, mines or artillery grenades containing an explosive
filling. The transportation means of the processed ammunition either passes
slowly or it stops between the infrared heaters 3, possibly under them or
simultaneously between and under them, while the infrared heaters 3 are put
10 into operation and they transfer the heat to the processed ammunition. The
infrared heaters 3 may according to the installed power requirement radiate
either continuously or in interrupted manner in given time periods, as per
instructions of control section of the whole device, or of control section in each
of the distributors R. By effect of the heat from infrared heaters 3 the explosive
15 filling is liquefied and by itself flows through the grate into the collecting vessel
in the transportation means of the processed ammunition. Subsequently, the
transportation means of the processed ammunition leaves the space of infrared
heaters 3, the transportation means is unloaded, the emptied ammunition and
the liquefied explosive filling are sent for further processing. The transportation
20 means of the processed ammunition is returned to be loaded with a new batch
of processed ammunition, at the same time it is obvious, that in one device
more transportation means may be used to improve the serviceability and to
shorten waiting time. It is also apparent, e.g. from the represented example of
embodiment, that the device may be created for a serial passage of a greater
25 number of transportation means on the transport route, similarly as at the flow
production.

Industrial applicability

The invention is applicable at disposal of old or surplus stock of ammunition.

CLAIMS

1. The device for smelting the explosive filling, especially TNT, from military ammunition, especially from mines, missiles and artillery grenades,
5 which comprises a heating means of ammunition assigned to the transport route of the processed ammunition, **characterised in that, the** heating means is formed of at least one infrared heater (3) directed to the transport route of the processed ammunition.

10 2. The device according to the claim 1, **characterised in that, the** heating means is formed of at least one infrared heater (3) positioned above the transport route of the processed ammunition and directed in direction downwards.

15 3. The device according to the claim 1, **characterised in that, the** heating means of processed ammunition is formed of at least one pair of infrared heaters (3) being arranged against each other, while the transport route of processed ammunition is arranged between the infrared heaters (3).

20 4. The device according to the claim 1, **characterised in that, the** heating means of processed ammunition is formed of at least one triad of infrared heaters (3), out of which two are arranged against each other with transport route of processed ammunition among them and the third infrared heater (3) is arranged above the transport route of the processed ammunition
25 and is directed downwards.

5. The device according to any of the claims 1 to 4, **characterised in that, the** infrared heaters (3) are arranged in chambers (1) behind the transparent safety panel (2).

6. The device according to the claim 5, **characterised in that**, at least two infrared heaters (3) are arranged in each chamber (1).

7. The device according to the claim 5, **characterised in that**, the
5 transparent safety panel (2) is a sheet of silica glass.

8. The device according to any of the claims 5 to 7, **characterised in that**, in the chambers (1) is arranged a distributor (R), with which are connected the infrared heaters (3) of the respective chamber (1).

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9. The device according to any of the claims 1 to 8, **characterised in that**, between the infrared heaters (3) and the transport route of processed ammunition are positioned the auxiliary safety frames.

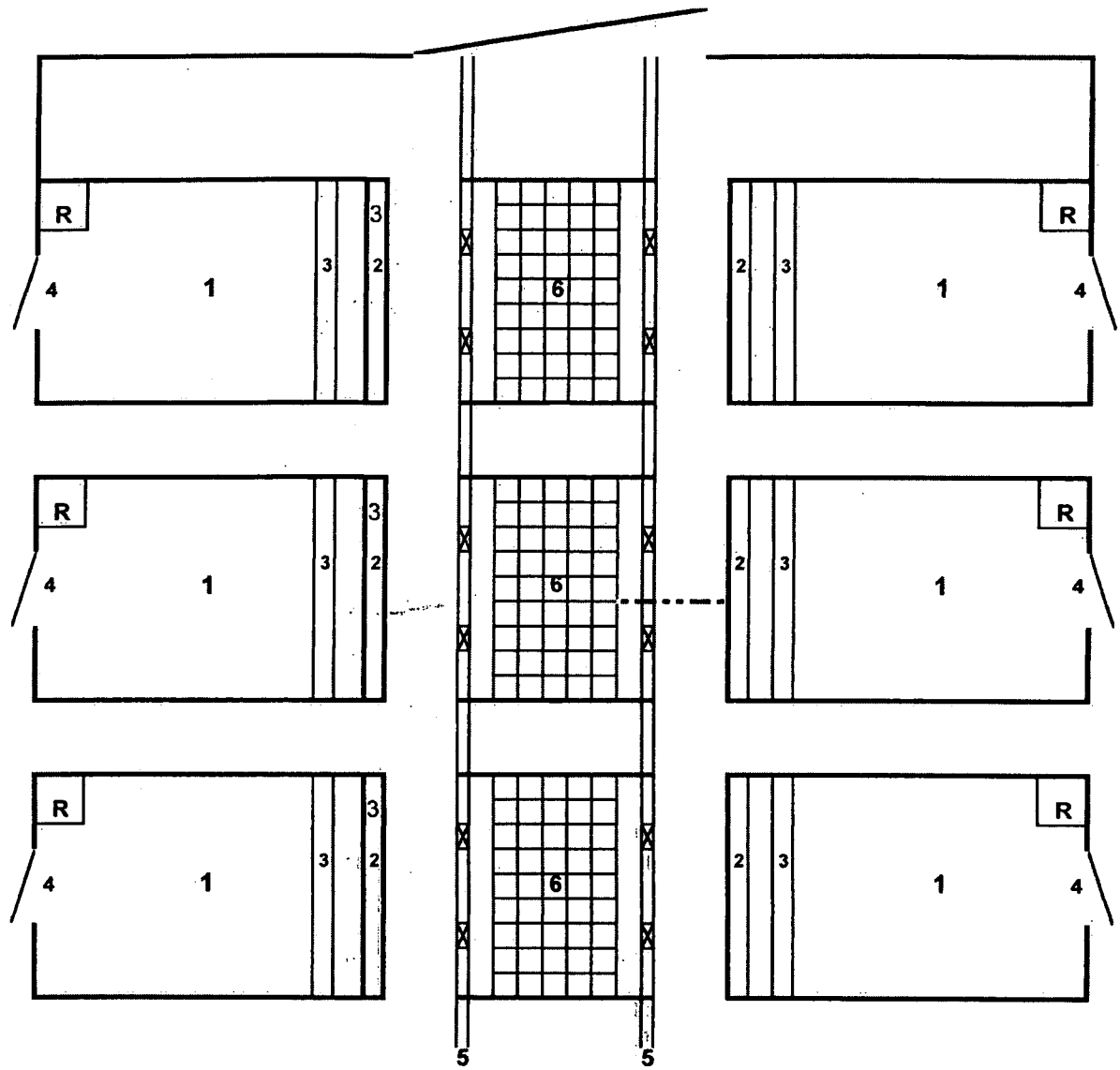


Fig. 1