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

(11) Publication number: **0 410 064 A1**

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number: **89600019.7**

(51) Int. Cl.5: **F42C 15/44**

(22) Date of filing: **02.10.89**

(30) Priority: **20.07.89 GR 89100460**

(43) Date of publication of application:
30.01.91 Bulletin 91/05

(84) Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

(71) Applicant: **Karamanolis, Panagiotis**
Mavragani Street 1a
GR-15669 Papagos/Athens(GR)

(72) Inventor: **Karamanolis, Panagiotis**
Mavragani Street 1a
GR-15669 Papagos/Athens(GR)

(54) **Self disarming fuze for cargo munition grenades.**

(57) The self disarming fuze, for cargo munition that is used on grenades that are being carried above the target by cargo munitions and dispersed in a great area, and exploding after the impact on the ground, sea, or any other target. The fuze is being armed during the rotation of the grenade immediately after its expulsion from the projectile, and in an adequate height above the ground.

In case the grenade hits the target, or the ground and the fuze will not operate,(remotest possibility), then the fuze will immediately return to the disarmed position, making the grenade completely safe for handling, or for the occasion that a truck, or any other vehicle, or even personnel, will go through the bombarded area.

EP 0 410 064 A1

SELF-DISARMING FUZE FOR CARGO MUNITION GRENADES

The invention is referring to a self disarming fuze that can be used in grenades of artillery cargo munition, as well as in rotating mortars, bombs, and rockets.

The fuzes in use today, in cargo munitions, do not solve the significant problem of not exploded granades in the battlefield, or in the training field.

The unexploded grenades are dangerous for the troops that will go through the bombarded areas, as well as for the field cleaning personel.

The armies that are currently using cargo munitions, demand the use of a fuze, for the grenades, that will be self-destructive in the case that they will not operate, for any reason, after the impact on the target.

The only way of self distruction, that has been devised up to now is pyrotechnical. This solution is not acceptable by the users, because, besides the high cost, in a case that the self destruction mechanism will not operate, even to a low percentage, it will render the grenades more hazardous than the ones that are using common fuzes.

The described fuze, that constitutes the opject of the invention is self disarming, in the occasion that it will not operate after the impact on the target, making the grenade entirely harmless.

For the rare occasion that the fuze will not operate explosively and it will not self disarm after the impact of the grenade on the target, the fuze is again harmless for the troops that will go through the field and accidentally step on a grenade.

In figure 1, an overall picture of the fuze is given, with the slider (2) of the detonator (7), in a safe position that is achieved by the pressure of the spring (6).

In this case, the detonator (7) and the striker (3), are off line. In addition the slider (2) cannot move in the armed position, because the end of the striker (3) is inside an opening of the slider (2)-,and retained in this position by the safety (5). The entire system of the slider (2) and the striker (3) and the safety (5), is inside the shell (1) and enclosed with the metal plate (11). In figure 2 (side section) the fuze is shown in the armed position. By the rotation of the fuze, the safety (5) of figure 1 is separated and the striker (3) has been retracted from the slider (2) because of the expansion of the spring (4) of figures 1 and 2. The slider (2), because of the centrifugal force, has moved in a way that the detonator (7) is on line with the striker (3) making the spring (6) be compressed.

The exact position of the slider (2), is determined by the end stopper (2a), that is freely sliding in an opposite groove (12) of the shell (1).

The upright position of the grenade during the fall is assured by the ribbon (13), that is firmly attached on the top of the fuze with the metal straps (9) and (14). The metal straps (9a) and (9b), in the ribbon ends, during the rotation maintain the ribbon in an almost horizontal position, simulating in this maner the helicopter blades. The metal straps (9a) and (9b) can be omitted if the ribbon, when rotating, has enough weight to maintain its horizontal position during the rotation of the grenade.

In figure 3 (side view) is shown the fuze when the grenade is hitting the target. The striker (3), because of the inertia, has struck the detonator (7), causing its explosion. In figure (4) the slider (2) is shown in top and side view. In location (1) the detonator (7) of figures 1,2,3 is placed. In location (3) the end of the striker (3) figures 1,2,3 is inserted when the fuze is in safe position.

The groove (4) is making the movement of the slider (2) easier during the arming procedure. The movable cylinder or sphere (6), is located in groove (5).

The reason for the cylinder of sphere (6) is to maintain the slider (2) in armed position when the spin of the fuze is reduced or stopped.

In figure 5 (down view of the shell (1) of figures 1,2, and 3) are shown:

-The groove (12) in which the stopper (2a) of figures 1,2 and 3 can slide freely.

-The two holes (16) and (16a), are used to mount the fuze on the grenade.

-The cylindrical cavity (10) inside which the striker (3) can move in figures 1,2, and 3.

-The opening (15) that is used for partial entry of the cylinder (6) of figure 4 when due to the centrifugal force, the slider (2) of the detonator of figure 4 has stopped in the armed position.

The section of the cylinder (6) in figure 4 that has moved in to groove (15) restricts the movement of the slider to the safe position, despite the pressure of the spring (16) in figures 1,2, and 3.

If during the impact, and for any reason, the detonator (7) of figures 1,2,3 will not explode, then, because of the shock, the small cylinder (6) of figure 4, is retract toward the groove (5) of figure 4 and the slider (2) with the pressure of the spring (6) of figures 1,2 and 3 returns to the safe position as in figure 1.

In figurs 6,7 and 8, are shown the above mentioned metal plates (14) (9) and (11) of figures 1 and 2.

In figure 9,is shown the fuze as it will be assembled and ready for shipping. The safety pin (17), is holding the ribbon (13) tight in place and also helps the loading of the shell with grenades in

a special order.

Claims

1. The self disarming fuze for cargo munition grenades which consists of the following.
   a. The cell (1), figure 1.
   b. The slider, figure 4.
   c. The striker (3), figure 1.
   d. The safely pin (5), figure 1.
   e. The spring (4), of the striker (3) figure 1.
   f. The spring (6), of the slider (2) figure 1.
   g. The ribbon (13), figure 2.
   h. The metalsheet (9), in figure 2, which holds the ribbon.
   i. The metal sheets (9a) and (9b), figure 2.
   j. The cylinder or small sphere (6), figure 4.
   k. The metal sheet (14), figure 6.
   l. The metal sheet (11), figure 8.

2.The self disarming fuze for cargo munition grenades, as in claim 1, is distinguished from the ribbon (13), figure 2 which is securely attached on the top of the fuze, and rotates with the grenade, assuring this way the vertical fall of the granade to the ground or to the target.

3.The self disarming fuze for cargo munition grenades, as in claim 1, is distinguished from the striker (3) in figure 1, which is independent from the ribbon and is retracted from the detonator (7), figure 2 with the help of the spring (4) figure 2, after its impact to the detonator (7), figure 2.

4.The self disarming fuze for cargo munition grenades as in claim 1, which is distringuished from the fact that the slider (2) of the detomator (7), figure 2, (the details can be seen in figure 4) , moves to the armed position because of the centrifugal force, overcoming the spring (6) force, figures 1,2, and 3.

5.The shelf disarming fuze for cargo munition grenades as in clain 1, which is distinguished by the fact that the cylinder or sphere system (6) of figure 4 that enters the groove (15), figure 5, because of the centrifugal force and holds the slider (2), as in figure 2, in the armed position, even ifthe spin is reduced or stopped during the free fall of the grenade.

6.The shelf disarming fuze for cargo munition grenades as in claim 1, which is distinguished by fact that the safety (5), figure 1, is holding the slider (2), figure 1, in a non armed position, until the expulsion of the grenades from the shell.

7.The self disarming fuze for cargo munition grenades as in claim 1, which is distinguished by the fact that the shell (1), figure 1, has certain grooves, that the slider (2), the striker (3), and the safeties operate properly. Top view of the shell can be seen in figure 5.

8.The self disarming fuze for cargo munition granades as in claim 1, which is distinguished by the fact that the metal sheets (14) and (11) of figures 6, and 8 respectively, are holding the fuze as an assembly, and also increasing the strength and endurance of the fuze in the extremely high accelerations of 15.000 G^s that are exerted on the projectile during the firing of the cannon.

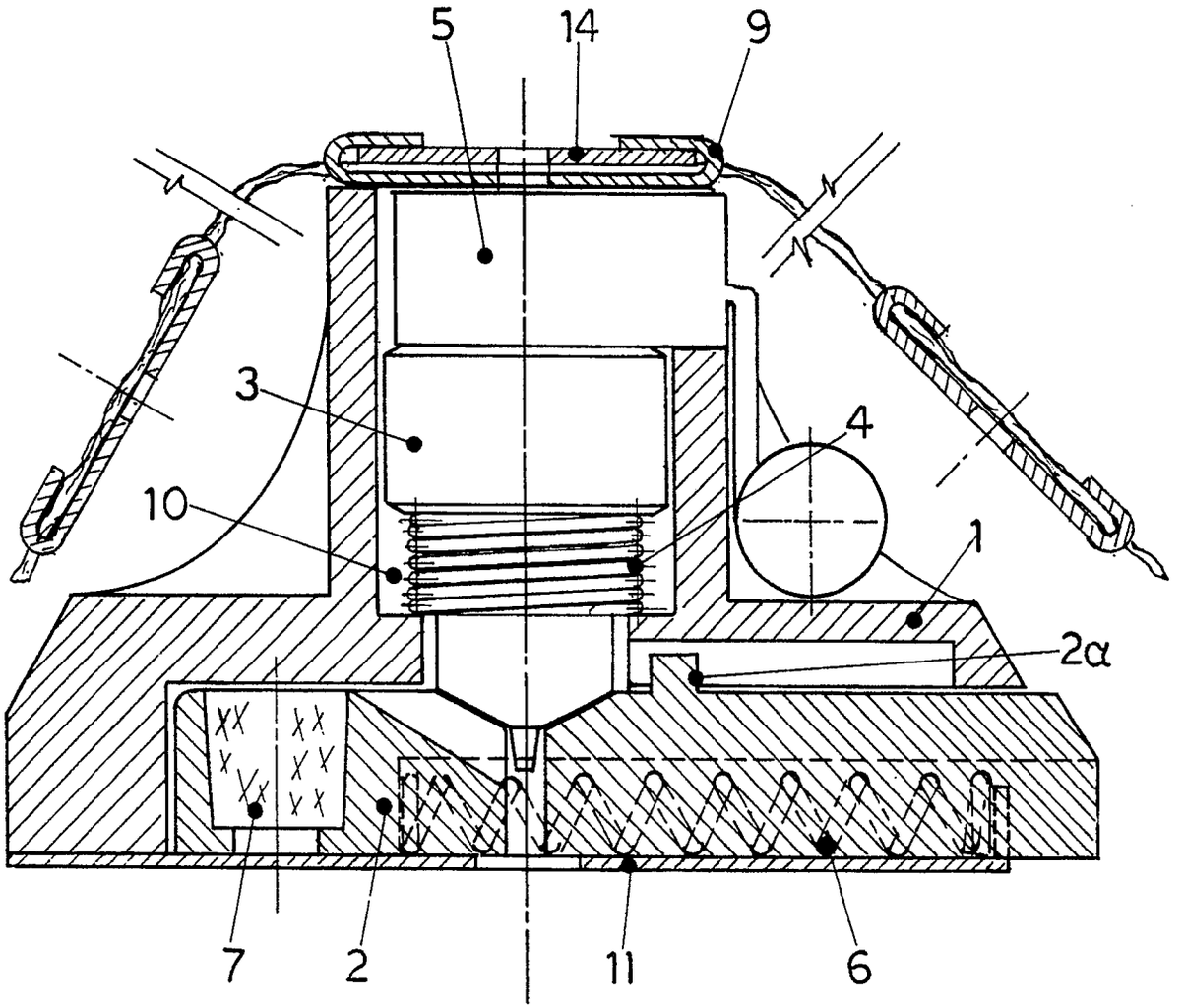

fig 1

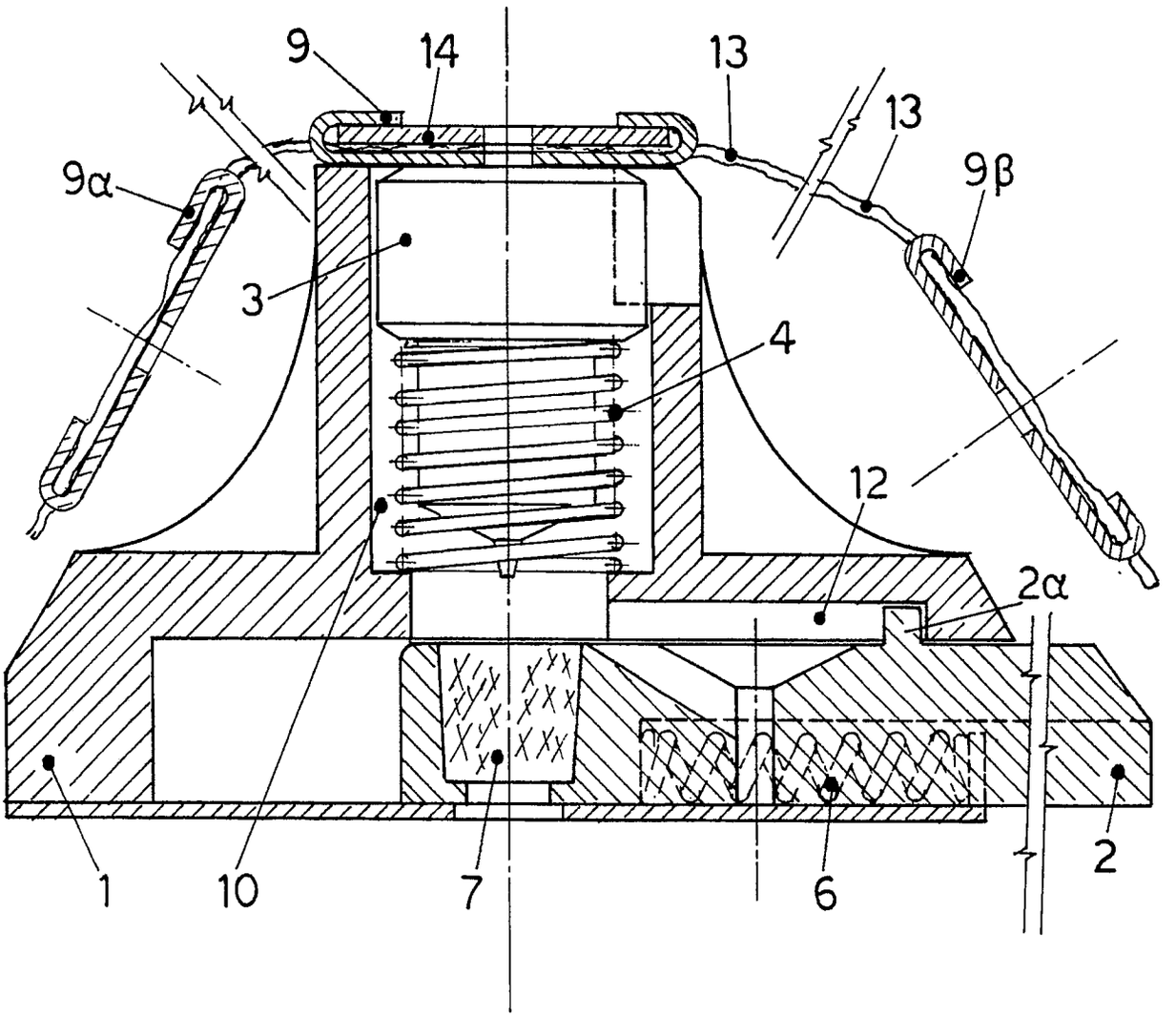

fig 2

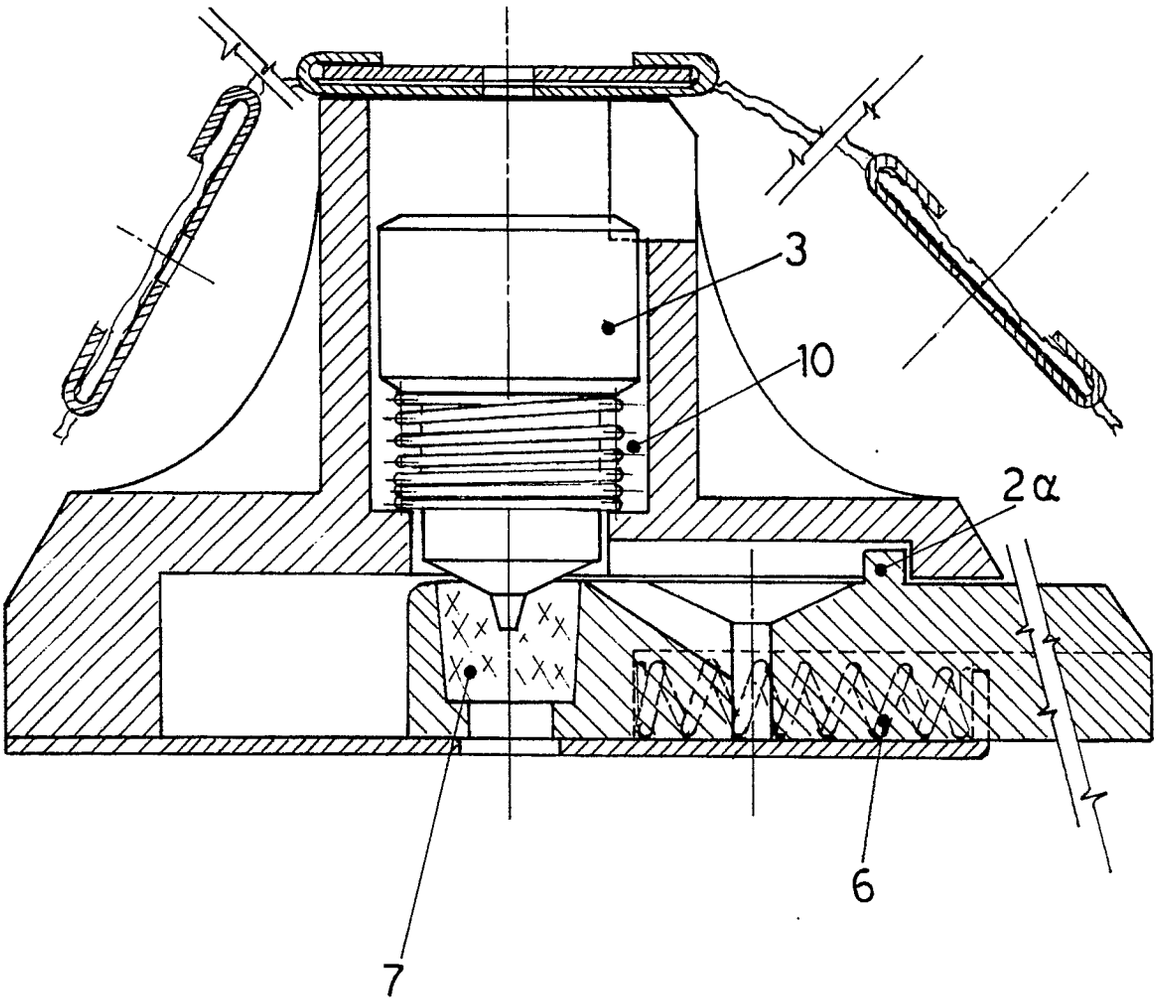

fig 3

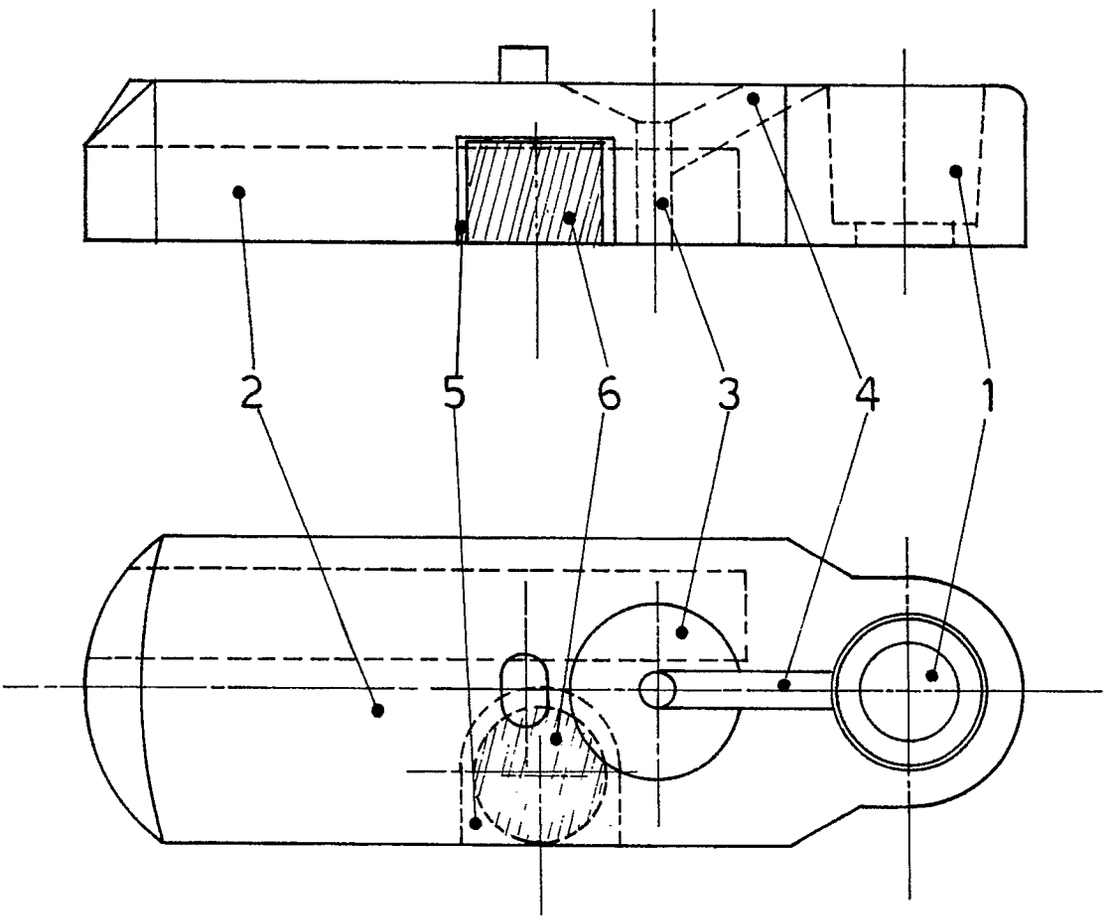

fig 4

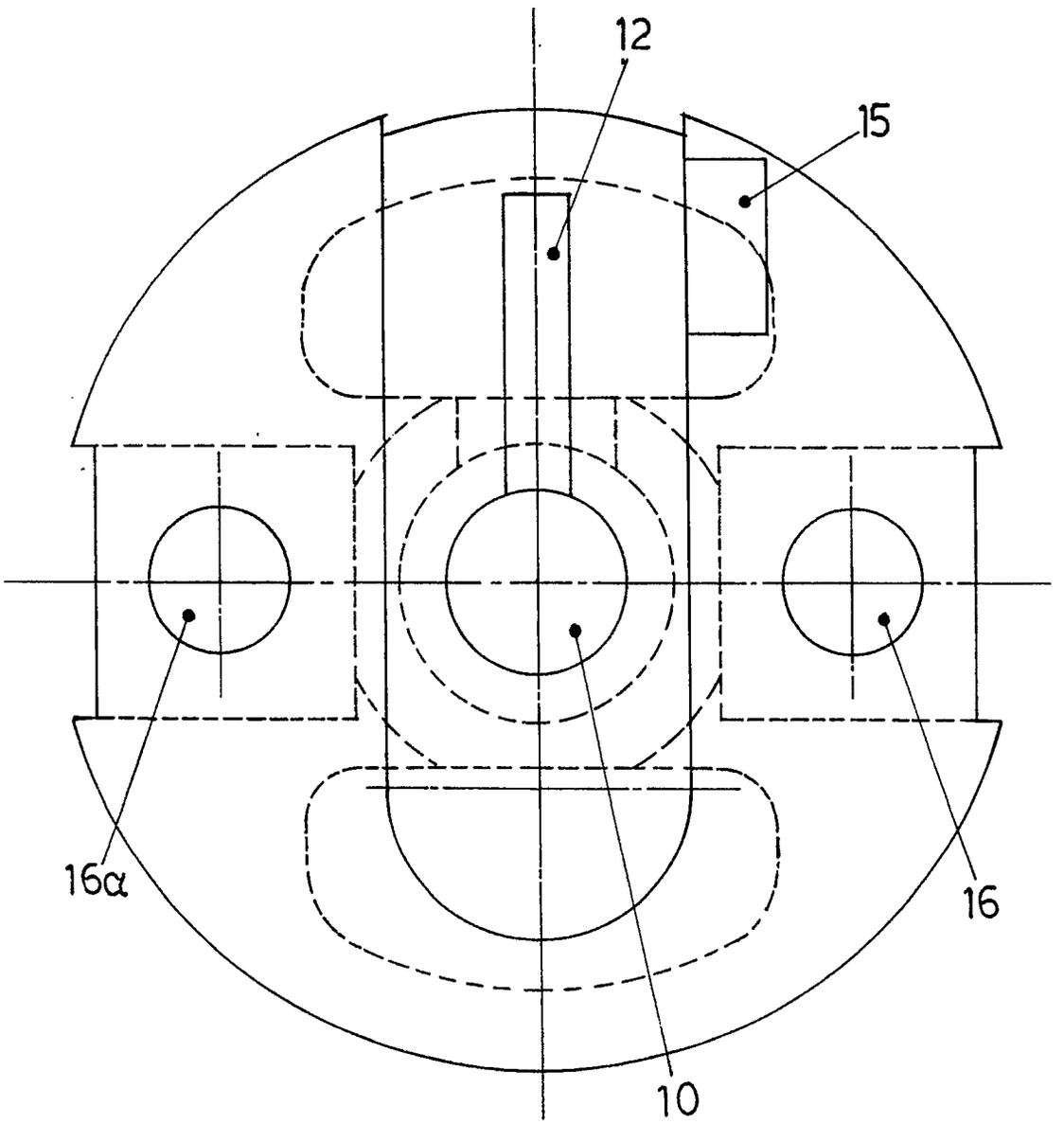

fig 5

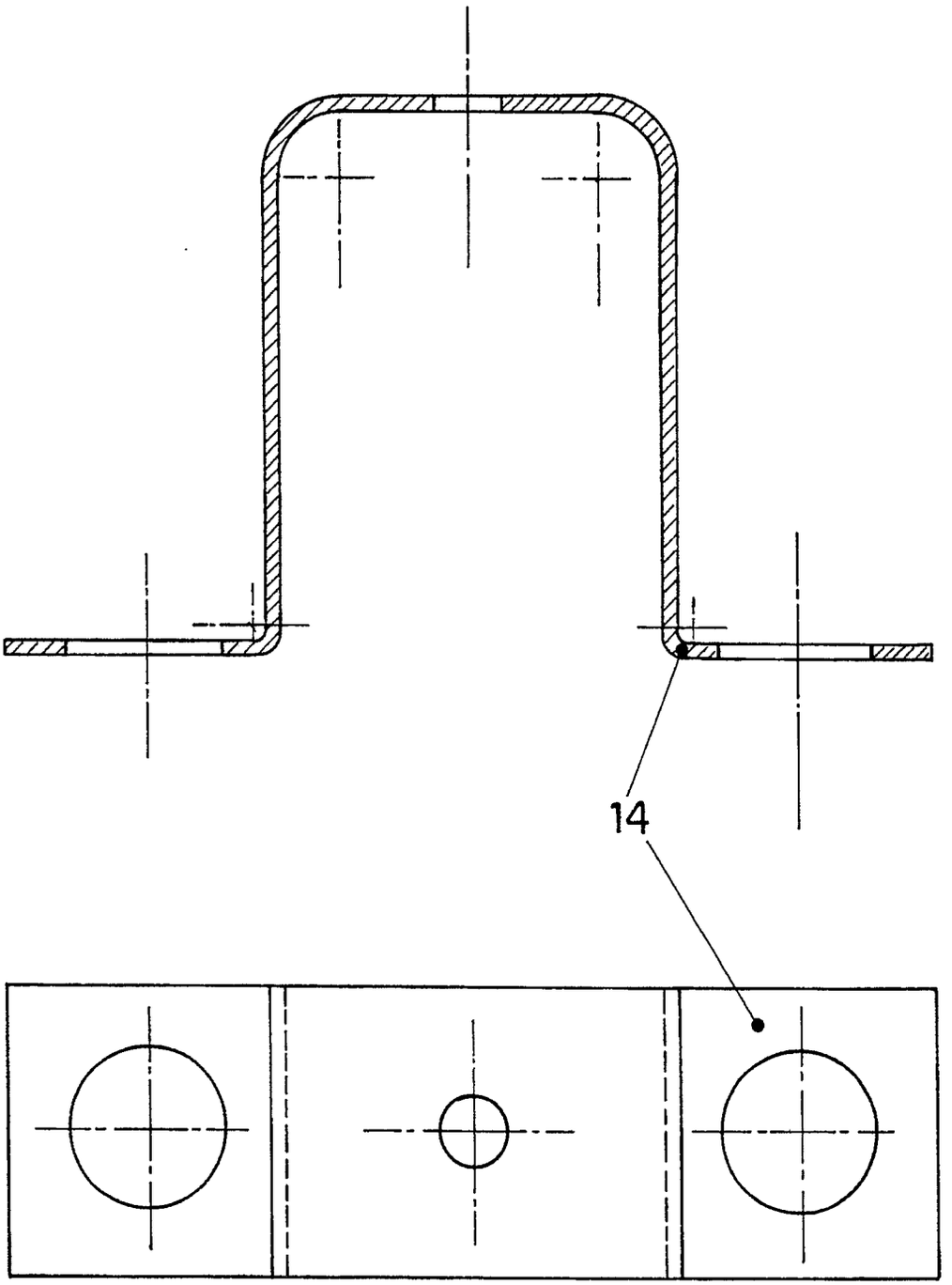

fig 6

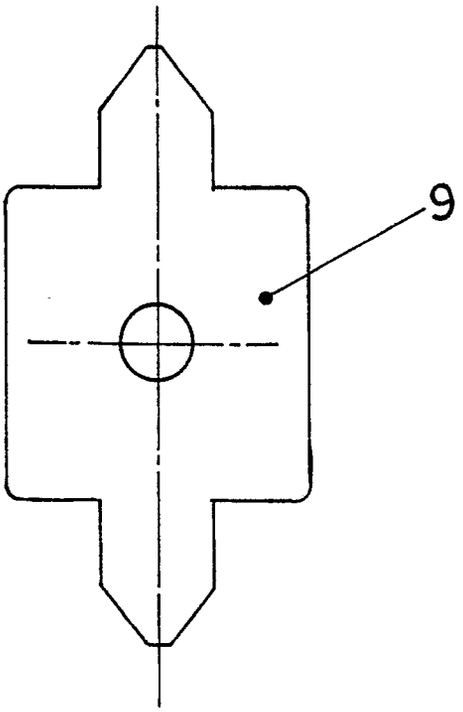

fig 7

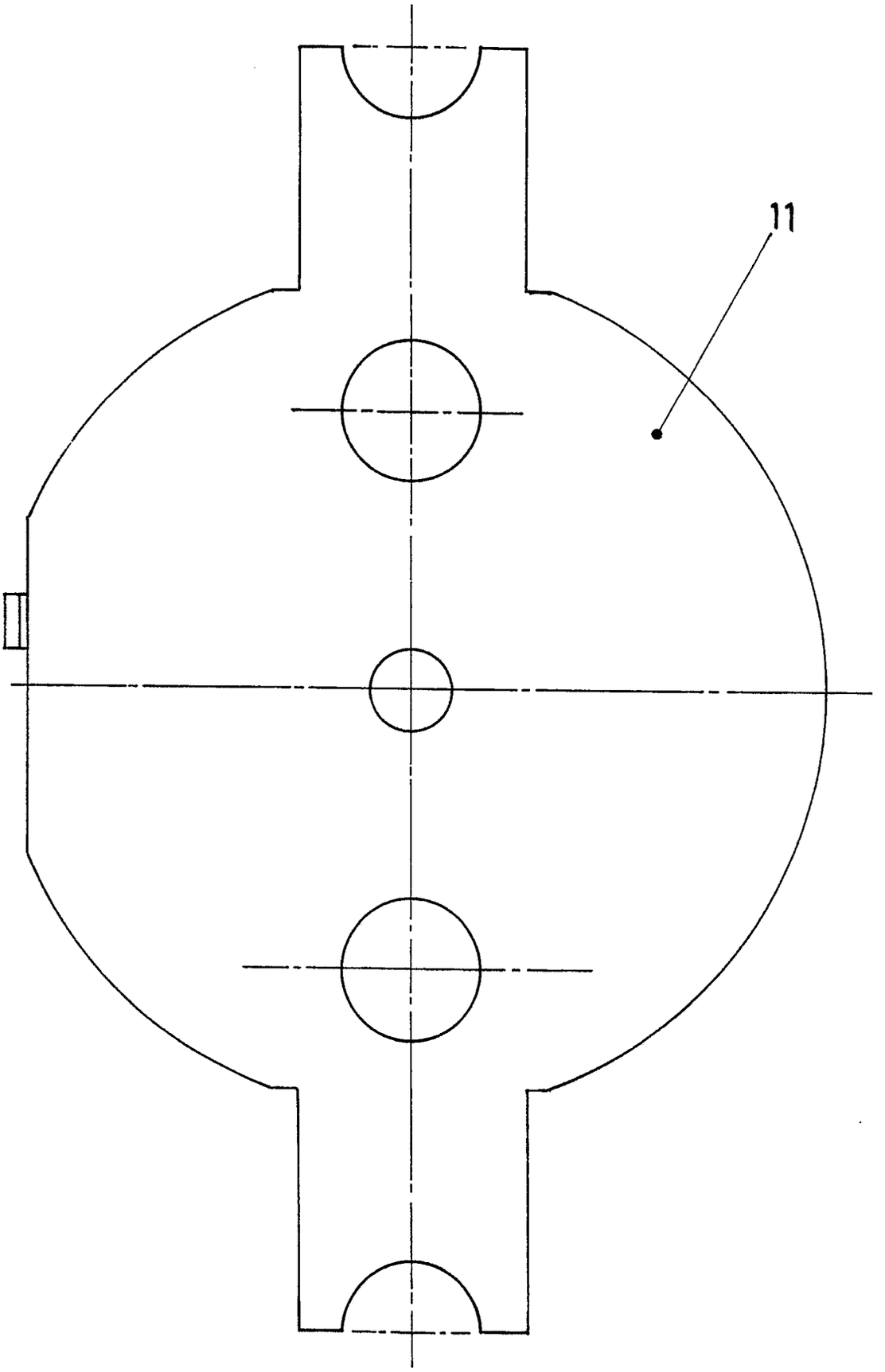

fig 8

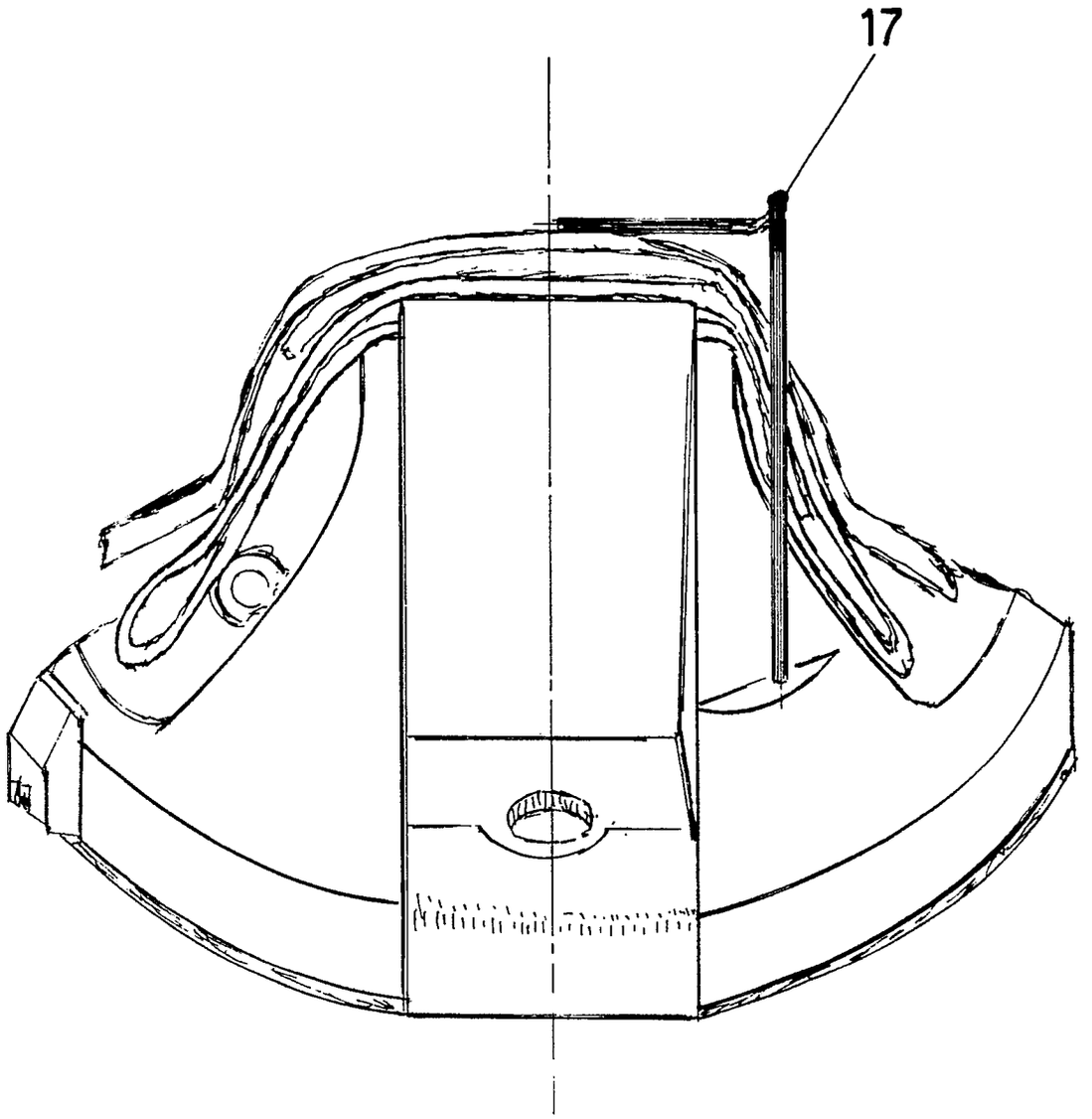

fig 9

European Patent Office

EUROPEAN SEARCH REPORT

Application Number EP 89600019.7

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	US - A - 3 956 992 (MICHAEL T. TARI) * Text column 1, line 35 - column 3, line 44; fig. 1-4 *	1-8	F 42 C 15/44
Y	US - A - 3 926 122 (WILLIAM W. WOLTER MAN) * Text column 1, lines 29-68; column 2, line 1 - column 5, line 15; fig. 1-6 *	1-8	
A	US - A - 4 762 066 (RUDENAUER et al.) * Totality *	1,2,4, 6,8	
A	US - A - 4 612 858 (BACKSTEIN et al.) * Text column 1, line 42 - column 4, line 57; fig. 1-8 *	1,3,4, 5,6,8	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			F 42 B 12/00 F 42 B 25/00 F 42 C 1/00 F 42 C 15/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	23-11-1990	KALANDRA

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P0401)