

"Mine Magazine for a Mine-Sowing Device"

The present invention relates to a mine magazine for a mine-sowing device, comprising a box-like housing for the reception of at least one stack of mines and an opening in the bottom of the housing, closed by a
5 door.

As is known, helicopters equipped with mine-sowing devices are currently used for the rapid sowing of mines.

A known sowing device comprises a number of vertical magazines housed in a frame; each magazine has a bottom
10 opening closed by a door and it contains mines stacked one upon the other. The doors of the magazines can be opened on command, either singly or in sequence, to allow the mines contained in the magazines to fall freely. This is known as sowing.

15 It is possible that during sowing a mine may become jammed in the opening of the corresponding magazine, bringing about a very dangerous situation.

In fact two cases can occur: the jammed mine may free itself at random, or it may remain jammed. In the first
20 case the mine might fall at a wrong moment, with the risk of ending up, even, in friendly territory. In the second case it could actually explode when the helicopter deposits the mine sowing device on the ground.

It is therefore extremely important that the pilot of
25 the helicopter should know when a mine remains jammed, in order that he may take the consequent action.

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For this purpose up until now, recourse has always been had to simple visual checking by personnel on the ground or in other aircraft. While the probability of jamming is minimal, it is also true that the danger in such an
5 eventuality is such that checking certainly cannot be considered satisfactory which relies on the sensitivity and attention of personnel, still less those aboard the helicopter in question.

The fundamental problem with which the present invention
10 is concerned is therefore that of detecting and signalling in timely fashion to the pilot of a mine-sowing helicopter any jamming of one or more mines.

This problem is resolved according to the present invention by a mine magazine of the aforesaid kind,
15 comprising a heavy body guided vertically within the box-like housing and resting freely upon the uppermost mine of the said at least one stack of mines, and a proximity sensor mounted upon the housing in the vicinity of the door to detect the presence and/or the passage
20 of the heavy body.

The invention will be further understood from the following description, given by way of non-limiting example, with reference to the accompanying drawings, in which:

- Figure 1 is a vertical sectional view of a mine
25 magazine according to a first embodiment of the invention, before the sowing of its mines;
- Figure 2 is a sectional view of a detail of the magazine in Figure 1 at the end of mine sowing;

- Figure 3 is a sectional view of the detail of Figure 2 with a mine in the jammed position;
 - Figure 4 is a vertical sectional view of a mine magazine according to a second embodiment of the invention, before the sowing of its mines;
 - Figure 5 is a sectional view of a detail of the magazine in Figure 4 after sowing of the mines; and
 - Figure 6 is a cross section of the magazine in Figure 4, taken along the line VI-VI.
- 10 The mine magazine shown in Figure 1 comprises a box-like housing 1. The housing 1 holds mines 2 arranged vertically one upon the other in four parallel stacks. The uppermost mines of the stacks are indicated 6.
- 15 An opening 4 is formed in the bottom 3 of the housing 1, closed by a door 5 which is controlled by wholly conventional means, not shown.
- A heavy body 7 rests upon the uppermost mines 6 of the stacks; this heavy body 7 is guided for movement
20 vertically within the housing 1 by a sliding block 9, which is slidable within a guide 8 extending along the housing 1. To advantage the guide 8 is fitted with an end-of-stroke buffer stop 10, in the vicinity of the opening 4, to retain the sliding block 9 in
25 the housing 1 and hence to prevent the heavy body 7 falling out of the said housing 1.

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The magazine also includes a proximity sensor, placed in the vicinity of the door 5, which detects the presence (or the passage) of the heavy body 7, as will appear hereafter in the description. The said sensor 5 according to a preferred embodiment comprises a magnetic field detector 11 affixed to the housing 1 in proximity to the aperture 4 of the latter, and a magnetic field source, for example a permanent magnet 12. Referring to Figs. 1, 2 and 3, the said permanent magnet 10 12 is fixed to a lever 13 having one end 15 mounted rotatably upon a pin 14 fixed to the internal wall of the said housing 1. The other end 16 of the said lever 13 is turned back so as to form a substantially wedge-shaped head the side 17 of which diverges from 15 the said lever 13.

The lever 13 is movable angularly around the pin 14 from a position in which the permanent magnet 12 is close to the magnetic field detector 11 (Figure 2), to a position in which the said permanent magnet 12 is 20 spaced from the said detector 11 (Figures 1 and 3).

In this latter position (in which the lever 13 is retained by spring means, not shown since it is conventional in itself) the side 17 of the substantially wedge-shaped end 16 of the lever 13 is in the path 25 of vertical movement of the peripheral edge of the heavy body 7.

The operation of the magazine described is as follows.

In order to carry out sowing of the mines, the door 5 30 is opened, in wholly conventional manner. When the door is opened, the mines 2 fall one after the other out of

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the magazine housing 1, through its bottom opening 4.

The heavy body 7 follows the last mine 6. If sowing proceeds regularly without jamming, the heavy body reaches the bottom 3 of the housing 1, where it is
5 retained by the stop 10.

Before coming into contact with the stop 10, however the peripheral edge of the heavy body 7 engages the side 17 of the free end 16 of the lever 13, causing angular displacement of the latter towards the detector 11.

10 Upon sensing the proximity of the permanent magnet 12, the detector 11 emits a signal which can be used to indicate that sowing has taken place correctly, for example by lighting or extinguishing a pilot light on an instrument panel.

15 If a mine jams during sowing the heavy body 7 cannot engage the lever 13, as illustrated in Figure 3; in this case the detector 11 does not sense the magnet 12 and does not give the signal indicating that correct sowing has occurred.

20 Naturally various embodiments of the present invention are possible within the scope of the claims. Thus, for example, in the variant embodiment illustrated in Figures 4, 5 and 6, the permanent magnet 12 is fixed on the heavy body 7 and preferably on its lateral wall 7a.

25 When sowing has taken place correctly the heavy body 7 is retained by the stop 10, in correspondence with the opening 4, and the detector 11 senses the proximity of the magnet 12 and emits a corresponding signal.

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In the event of a mine jamming, the heavy body 7, and with it the permanent magnet 12 do not reach the bottom position against the stop 10, so that the detector 11, not sensing the presence of the said magnet, cannot 5 emit the signal indicating that correct sowing has occurred.

Other technically equivalent versions are possible, so long as the magnetic field source or other like device is responsive to the presence and/or the passage of the heavy body 7.



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CLAIMS

1. A mine magazine for a mine-sowing device, comprising a box-like housing for the reception of at least one stack of mines and an opening in the bottom of the housing, closed by a door, the magazine comprising:
 - 5 - a heavy body guided vertically within the box-like housing and resting freely upon the uppermost mine of said at least one stack of mines, and
 - a proximity sensor mounted on the housing in the vicinity of the door for detecting the presence and/or
 - 10 the passage of the heavy body.
2. A magazine according to Claim 1, in which the proximity sensor comprises a magnetic field detector fixed to the housing and a magnetic field source engageable by the heavy body and guided for movement
- 15 within the housing between a position remote from detector and a position close to it, when the heavy body is on the bottom of the said housing.
3. A magazine according to Claim 2, in which the magnetic field source is fixed to a lever having one
- 20 end pivoted internally to the housing in proximity to the bottom opening therein, and the other end free and movable towards and away from the detector, the said free end being normally in a position which lies in the path of vertical movement of the heavy body
- 25 within the housing.
4. A magazine according to Claim 2, in which the magnetic field source is fixed to the heavy body.
5. A magazine according to any one of Claims 2 to 4, in which the magnetic field source is a permanent magnet.



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6. A magazine according to any one of the preceding claims, in which the heavy body is mounted upon a sliding block movable upon a guide extending within said box-like housing, a stop being provided in the vicinity of the said opening for retaining the said sliding block in the housing.

7. A mine magazine substantially as herein described with reference to and as shown in Figures 1 to 3 or Figures 4 to 6 of the accompanying drawings.
