Oct. 28, 1958 K. O. B. MALM 2,857,842

LAND MINE

Filed March 12, 1956

FIG. 1.

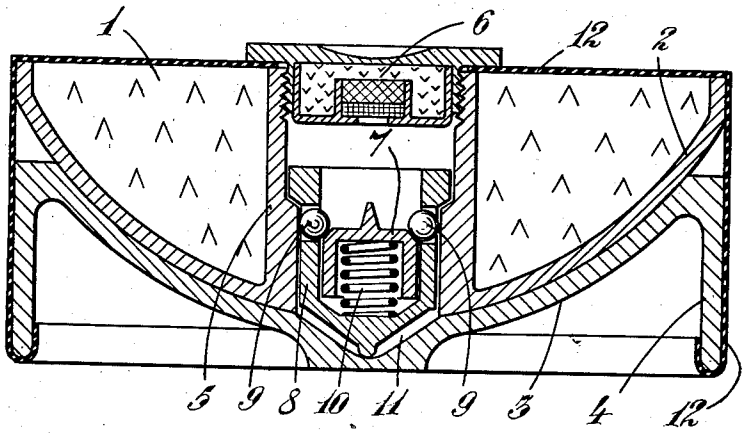
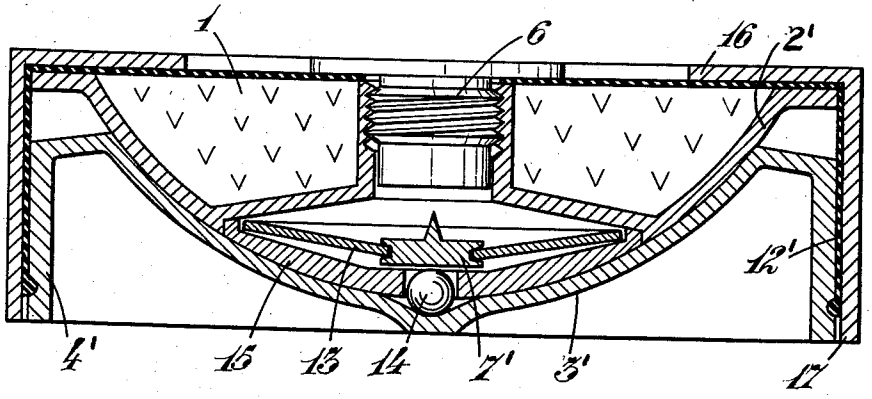


FIG. 2.



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LAND MINE

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The present invention relates to an arrangement in land mines of the kind which are provided with a detonator to be initiated by means of a percussion device and provided with a releasing device which is inoperative when acted upon by pressure waves in the air but operable by being tilted into an inclined position when the mine is treaded upon or actuated by a car or the like. The invention is characterized chiefly by the fact that the releasing device is mounted in a spherical bearing in the mine in such a way that the percussion device is brought into action by a mutual displacement of the spherical bearing surfaces.

The invention is illustrated on the accompanying drawings which in Figs. 1 and 2 show two different embodiments of the land mine in a vertical section.

In the example shown in Fig. 1 the bursting charge **1** is provided in a calotte-shaped receptacle **2** which is open upwards and turnable in all directions in a bowl **3** having a spherical bottom which forms the stationary part of the spherical bearing. The bowl **3** is provided with a cylindrical flange **4** which together with the central part of the bowl forms the support of the mine when placed on the ground. The receptacle **2** is provided with a central tube **5** into the upper end of which a detonator **6** is screwed which in the usual way is provided with a bursting charge and an initiating charge arranged to be actuated upon by a percussion device. The device last mentioned consists in the example shown of a percussion pin **7** guided in a cylindrical piston **8** and normally held in retracted position by balls **9** against the action of a spring **10**. The lower pointed end of the piston **8** normally projects into a recess **11** in the spherical surface of the bowl **3**. The mine is closed by means of an elastic covering **12** of rubber or the like.

When the mine is treaded upon the pressure will act eccentrically on the upper surface of the mine or on the edge of the receptacle **2** so as to cause the latter to tilt over in its spherical bearing and take up an inclined position. The receptacle **2** will then act as a releasing device for the percussion device as the piston **8** is now pressed upwards in the tube **5** until the balls **9** are in level with a wider part of the tube **5** when the balls are pressed out of their stopping positions so as to release the percussion pin **7** which, by the action of the spring **10**, is flung against the detonator thereby causing the charge to burst.

In the example shown in Fig. 2 the percussion pin is inserted in an elastic and resilient washer **13**, a so-called Belleville washer, by means of which the percussion pin is normally held against a ball **14** inserted in a hole in a central part **15** of the bottom of the receptacle **2'**, the ball being at the same time kept in engagement with the central recess in the bowl **3'**. When the receptacle **2'** is brought into an inclined position, the ball **14** is pressed upwards, thereby causing the percussion pin **7'** by the spring action of the washer **13**, to be carried over its position of equilibrium so as to operate the detonator.

The mine may be put on safe by screwing away the detonator **6**. In order to prevent unintentional bursting when the mine is placed on the ground the mine is covered, before being laid out, with a lid **16** provided with a cylindrical flange **17** enclosing the mine whereby the releasing device is locked. After the mine has been in this way made safe to handle the detonator is inserted through the central opening of the lid **16** and screwed into place. The mine is then placed on the ground and, finally, the lid **16** is removed.

The free space underneath the bowl **3'** may, if required, be filled up with a bursting charge. The receptacle **2'** and the bowl **3'** may be made of any suitable substance. For the rest the mine is chiefly made of non-magnetic material with the exception of the percussion pin which should be of steel. Also the washer **13** may be made of non-magnetic material.

It will be evident that an evenly distributed pressure on the upper surface of the mine will not cause a release of the percussion device. As a consequence, the mine cannot be actuated by pressure waves caused by charges bursting in the neighborhood.

What is claimed is:

1. A land mine comprising, in combination, a base member having an upper concave spherical bearing surface, an operating member supported by said base member and having an upper tread surface and a lower convex spherical bearing surface concentric with and fitting the concave bearing surface of the base member, the operating member being mounted in the base member for free tilting movement in all directions, a percussion device mounted in one of said members, and means for actuating said percussion device upon tilting movement of the operating member relatively to said base member.

2. A land mine as defined in claim 1, wherein the operating member defines the container for the charge of explosive.

3. A land mine as defined in claim 1, wherein the base member and the operating member are joined together along their outer edges by an elastic covering.

4. A land mine as defined in claim 1, wherein the operating member is locked to the base member in non-operating position by a lid having a flange covering the outer side surfaces of both of said members.

5. A land mine as defined in claim 1, wherein one of said bearing surfaces is provided with a recess and said means for actuating the percussion device comprises an actuating member engaging in said recess and being adapted to be released upon mutual displacement of the bearing surfaces.

6. A land mine as defined in claim 5, wherein said recess is formed in the bearing surface of the base member and the percussion device is carried by a Belleville spring engaged by a ball seated in the recess in the lower bearing surface.

7. A land mine comprising, in combination, a base member having an upper concave spherical bearing surface formed with a recess, an operating member supported by said base member and having an upper tread surface and a lower convex spherical bearing surface concentric with and fitting the concave bearing surface of the base member, the operating member being mounted in the base member for free tilting movement in all directions, a spring actuated percussion device disposed axially in the operating member, and an actuating member movable coaxially with the percussion device and engaging in said recess in the spherical surface of the base member for actuation upon mutual displacement of said two bearing surfaces.

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