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Description

The present invention relates to a safety device usable for the activation of sowable mines, as defined in the preamble of claim 1.

In general, mines which adopt a safety device of the above-specified known type have an irregular external structure: in fact, they have an external configuration constituted by a pair of frustoconical portions connected at their major bases; axially from one of the smaller bases of these frustoconical portions extends a dome or pressure plate constituting the sensor element for the operation of the mine. In general, the above-mentioned safety device is constituted by a suitably shaped cover which is superimposed over the said dome whilst, through a suitable bridge arm it supports the pin which engages radially in the body of the mine.

It is observed that the unit constituted by the mine and the associated device is not well suited to be stacked together with similar such mines and associated safety devices in appropriate containers for the launching of armed mines, such as for example, the launcher tubes with which modern mines are sown from the ground or from helicopters, or specific carriers such as battlefield rockets or projectiles. In fact, because of the irregular peripheral structure of the unit comprising the mine and the above-described device, it is not possible to house the mines in a regular stack both because the contact zone between each mine and the cover of the safety device of the adjacent mine is not flat, and because, due to the particular structure of the cover of the device, there is an air space between each mine/safety device unit and associated facing inner surface of said container.

More particularly, in the above known safety device, the bridge arm connecting the cover to the pin protrudes externally from the periphery of the cover. This latter is formed of a ring upwards closed by a curved disk and connected thereto by a set of radial ribs, the disk and the ribs also protruding externally from the ring to operate as aerodynamic brake when the mine is launched.

It is observed that, especially in the case in which the trajectory followed by the mine-safety device unit is short, and this happens in general when launching is effected from helicopters, it happens that the safety device does not separate from the mine before falling on the ground. This essentially occurs due to the fact that, because of the limited duration of the external ballistic phase and the particular expulsion position of the mine-safety device unit, this latter is not oriented in the right direction by the air so that it does not become separated from the body of the mine, in some cases even after falling to the ground, and therefore the said pin prevents the mine from operating.

It is also known from the French Patent Specification FR—A—2,547,999 a mine permanently hinged to a protective cover normally locked on the mine by means of a bolt, against the urge of

an opening momentum. While this cover makes the mine suitable to be stacked, it is unadapted for a complete separation from the mine and cannot be released by the bolt till the mine has impacted on the ground.

The object of the present invention is that of providing a safety device able to overcome the above-indicated disadvantages of the devices of the above-listed known type.

The said object is achieved with the safety device of the present invention, which is characterised as specified in the characteristic of claim 1.

For a better understanding of the present invention a preferred embodiment is now described purely by way of non-limitative example and with reference to the attached drawings, in which:

Figure 1 is a transverse section of a safety device formed according to the present invention and illustrated in combination with a mine of known type;

Figure 2 is a side view of the device of Figure 1;

Figure 3 is a view from below of the device illustrated in Figures 1 and 2;

Figures 4 and 5 are respective sections taken on the lines IV—IV and V—V of Figure 3; and

Figure 6 relates to a container in which a plurality of mine/safety device units are stacked, illustrated on a reduced scale with respect to that used in Figure 1.

With particular reference to Figure 1, a mine essentially of known type is indicated generally with the reference numeral 1, which from the structural point of view has a body 2 constituted by two frusto-conical portions 3, 4 respectively joined at their larger bases the diameters of which are identical. A dome 6 extends axially and in a central position from the portion 4, which dome acts as a sensor element of the mine 1 which, if pressed, controls the explosion of the mine itself. This latter further has, within its portion 4, a radial socket through which it is possible to intercept and lock the arming mechanism (not illustrated) of the mine itself.

According to the present invention there is proposed a safety device generally indicated 10 and essentially comprising a cup-shape cover 11 able to cooperate with the frusto-conical portion 4 of the mine 1 against the action exerted by a flexing spring 12, and a pin 13 conveniently fixed, in a removable manner, to an outer edge of the cover 11 and operable to engage, in use, the socket 8 of the mine 1.

With particular reference to Figures 1, 3 and 5, it is observed that the cover 11 has a circular structure with a bottom wall 15 having a central through hole 16 and an annular seat 17 coaxial with the hole 16, which in use constitutes a housing seat for the dome 6 of the mine 1. As already said, the cover 11 is cup-shape and has a side wall essentially constituted by a plurality of peripheral tongues 19 extending perpendicularly of the wall 15; consequently, in a transverse sense, the cover 11 has an essentially cylindrical volume.

With particular reference to Figure 3, it is

observed that the spring 12 is of the wire type, extends essentially for a semi-circumferential section, and is housed within a corresponding groove 20 formed in the bottom wall 15 of the cover 11 on the side which in use faces the mine 1. In more detail, the spring 12 has a portion 21 entirely housed within the groove 20 and a portion 22 which projects from this groove 20 and is able to exert in use a resilient thrust on the surface of the smaller base of the portion 4 of the mine 1 for the purpose of separating the cover 11 from the body 2 of the mine itself. In more detail, it is seen that the spring 12 is retained within the groove 20 by means of a bridge 24 of the bottom wall 15 of the cover 11 in such a way as to cover a portion of the groove 20 in which an intermediate part of the spring 12 is housed. This latter further has a folded end portion 25 (see Figure 5) which extends at 90° from the portion 21 and engages a corresponding through hole 26 formed in the bottom 15 of the cover 11 in such a way as to prevent the spring 12 from slipping along the above-mentioned groove 20. This spring 12 has, finally, in a median zone of its portion 21, a deformed portion 27 in the form of a hump able to establish an interference in a transverse sense with the opposite walls of the groove 20 (see Figure 3) in such a way as to obtain a precise and constant positioning of the spring 12 with respect to this groove and therefore with respect to the cover 11.

With particular reference to Figures from 1 to 5, it is seen that the pin 13 is connected to the bottom wall 15 of the cover 11 by means of a fork element 32 having two wire-like arms 33, 34 which are joined together by a bridge portion 35 having a longitudinal slot 36. The end of each arm 33, 34 engages an associated through hole 37, 38 in the bottom wall 15 of the cover 11 and further carries an associated transverse portion 41, 42 the dimensions of which are such as to prevent the associated arm 33, 34 from coming out of the above-mentioned through holes 37, 38.

With reference to Figures 1, 2, 4 and 5 it is seen, finally, that the pin 13 has a transverse head portion 44 the dimensions of which are of the order of the bridge portion 35 of the fork element 32. Beneath this portion 34 and at a distance slightly greater than the thickness of the bridge portion 35 of the fork element 32 the pin 13 has a pair of diametrically opposite tabs 46, 47 the dimensions of which are such as to permit the passage thereof, with slight interference, into the interior of the slot 36.

With reference to Figure 6, this illustrates a launching tube, generally indicated 50, operable to launch a plurality of mines simultaneously, each equipped with an associated safety device 10. The launching tube 50 has a side wall 51 which is closed at one end by means of a plug 52 and at the other end by an expulsion device 53 of known type. In more detail, the plug 52 is fixed internally to the wall 51 of the tube 5 by means of a plurality of gripper teeth 54 which engage an annular groove 55 formed on the inside of the said wall

51. Moreover, the cover 52 has an annular seat 56 which receives an annular seal 57 interposed between the plug 52 and the facing inner surface of the wall 51. The device 53 is essentially a piston 59 movable axially with respect to the tubular wall 51 by the effect of the thrust exerted by a gas under pressure developed by the expulsion device 53 and acting on the surface of the piston 59 on the side opposite that facing the plug 52.

The operation of the device 10 is as follows. When the mine 1 is within the launching tube 50 the pin 13 is correctly inserted into the socket 8 and the cover 11 lies over the surface of the mine itself. Moreover, a portion 22 of the spring 12 is preloaded and therefore exerts on the facing surface of the mine 1 a thrust tending to maintain the cover 11 partially raised from the body 2 of the mine itself. Upon sowing of the mines the displacement of the piston 59 causes the end plug 52 to blow off therefore permitting the mines 1 and the associated devices 10 to escape freely. The separation of the device 10 from the body 2 of the mine 1 takes place initially by the effect of the spring 12 and subsequently by the fact that the body 11 is braked in a greater measure than the body of the mine 1 because of the particular shape of the cover 11 itself, which in practice constitutes an aerodynamic brake. This obviously causes the device 10 to fall separately from the mine 1 with consequent secure activation of the arming mechanism of this latter.

From a study of the characteristics of the device formed according to the present invention the advantages which can be obtained thereby are evident. First of all, this device serves both the functions of separator between the stacked mines and of boundary member between a mine and the associated container which, in the illustrated example, is constituted by the launching tube 50. In fact, the device 10 acts to complete the shape of the body 2 of the mine 1 in such a way as to obtain an overall volume of essentially cylindrical form which facilitates stacking as well as positioning with respect to the associated container. It is further observed that the cover 11 introduces practically no additional increase in the axial dimension from that represented by the body 2 of each mine 1 so that the number of mines which can be housed within the interior of an associated container is not limited axially thereby.

Further it is seen that the presence of the spring 12 facilitates the separation of the device 10 from the body 2 of each mine 1 in all cases and especially when the mine is launched by means of a ground mine sower such that the external ballistic phase after launch is rather short. Finally, it is seen that, because of the very loose connection between the pin 13 and the cover 11 the operation of removal of the pin 13 from the associated seat 8 is particularly easy.

It is evident that the spring 12 rather than being constituted by a wire, could be made and positioned in any other way providing it exerts a resilient thrust tending to separate the cover 11 of the device 10 from the body 2 of the mine 1.

Claims

1. A safety device for the activation of sowable mines, comprising a cover (11) which can be fitted on the body (2) of the mine (1), a pin (13) able to be introduced into a radial socket (8) of said body to lock the arming mechanism of this latter, and articulatable means (32) connecting said pin to said cover for enabling this latter to be separated from said body and to extract said pin from said socket, said cover having an essentially cup-shaped structure including a bottom wall (15), and a side wall (19) embracing said body, characterised by the fact that said side wall (19) is delimited externally by an essentially cylindrical surface, whereby a plurality of mines fitted with said cover (11) can be stacked into a cylindrical launching tube (50), said tube thus locking said pin (13) into said socket (8) and said cover on said body (2), spring means (12) being connected to said bottom wall (15) on the side which in use faces said body and exerting a resilient force tending to separate said cover from said body when said mine is expelled from said launching tube.

2. A device according to Claim 1, characterised by the fact that the said spring means (12) are essentially constituted by a wire spring having a first portion (21) fixed to the said bottom wall (15) and a second portion (22) which is raised with respect to the said bottom wall and which can be resiliently deformed when the said cover (11) is held against the surface of the body (2) of the said mine (1).

3. A device according to Claim 2, characterised by the fact that the said bottom wall (15) has an annular groove (20) to receive the said wire spring (12).

4. A device according to Claim 3, characterised by the fact that the said bottom wall (15) has positioning means (24, 26) for positioning the said spring (23) with respect to the said groove (20).

5. A device according to Claim 4, characterised by the fact that the said positioning means essentially comprise a bridge (24) which partially covers the said groove (20) for the purpose of constituting a stop element in the radial sense against displacement of the said spring (12).

6. A device according to Claim 4 or Claim 5, characterised by the fact that the said positioning means include a hole (26) which receives a bent head portion (25) of the said wire spring (12).

7. A device according to any of Claims from 2 to 6, characterised by the fact that the said first portion (21) of the said wire spring (12) has a deformed zone (27) which establishes a partial interference coupling in a radial sense with the said groove (20).

8. A device according to any of Claims from 2 to 7, characterised by the fact that the said wire spring (12) has a semi-annular conformation and by the fact that the said two portions (21, 22) are essentially identical in length.

9. A device according to any preceding Claim, characterised by the fact that the said side wall is

constituted by a plurality of tongues (19) distributed in an essentially uniform manner.

10. A device according to Claim 9, characterised by the fact that the bottom wall (15) of the said cover (11) has an essentially flat outer surface and a through hole (16) defining a seat to receive, in use, a sensor portion (6) of the said mine (1).

11. A device according to Claim 9 or Claim 10, characterised by the fact that the said articulated means (32) are housed between a pair of said tongues (19) internally to said essentially cylindrical surface.

12. A device according to any preceding Claim, characterised by the fact that the said articulatable means connecting the said pin (13) to the said cover (11) include at least one wire (33, 34) the opposite end portions of which are connected in a releasable manner to the said bottom wall (15) and to the said pin (13) respectively.

13. A device according to Claim 12, characterised by the fact that the said articulatable means essentially comprise a fork element (32) having two wire-like arms (33, 34) having first ends connected together by means of a bridge element (35) supporting the said pin (13) and having opposite free ends which hook onto the said bottom wall (15).

14. A device according to Claim 13, characterised by the fact that the said bridge element (35) has an internal slot (36) within which the said pin (13) is rotatable; this latter being fixed to the said bridge element (35) by means of a transverse head portion (44) which interfaces with the said element (35), and a pair of transverse tabs (46, 47) positioned beneath the said transverse element (44) and operable to deform the said bridge element (35) elastically to pass through the said slot (36) in such a way as to maintain the said bridge element (35) interposed between the said transverse head element (44) and the said tabs (46, 47) of the said pin (13).

Patentansprüche

1. Sicherheitseinrichtung für die Aktivierung von Streuminen, aufweisend einen Deckel (11), welcher an dem Körper (2) der Mine passend anbringbar ist, einen Zapfen (13), der in eine Radialbuchse (8) des Körpers einführbar ist, um den Scharfstellmechanismus des letzteren zu verriegeln, und eine Gelenkeinrichtung (32), welche den Zapfen mit dem Deckel verbindet, um dem letzteren zu ermöglichen, von dem Körper getrennt zu werden, und um den Zapfen aus der Buchse herauszuziehen, wobei der Deckel eine im wesentlichen schalenförmige Gestalt aufweist und eine Boden- (15) und eine Seitenwand (19) aufweist, die den Körper umgibt, dadurch gekennzeichnet, daß die Seitenwand (19) nach außen hin durch eine im wesentlichen zylindrische Oberfläche begrenzt ist, wobei eine Mehrzahl von mit dem Deckel (11) versehenen Minen, in ein zylindrisches Abschlußrohr (50) eingestapelt werden kann, und das Rohr auf diese Art und Weise den Zapfen (13) in der Buchse (8) und den

Deckel an dem Körper (2) verriegelt, wobei die Federeinrichtung (12) mit der Bodenwandung (15) an derjenigen Seite verbunden ist, welche beim Gebrauch dem Körper gegenüberliegt und eine nachgiebige Federkraft ausübt, die dahin tendiert, den Deckel von dem Körper zu trennen, wenn die Mine aus dem Abschußrohr ausgestoßen wird.

2. Einrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Federeinrichtung (12) im wesentlichen durch eine Drahtfeder gebildet ist, die einen ersten Abschnitt (21), der an der Bodenwand (15) befestigt ist, und einen zweiten Abschnitt (22) aufweist, welcher in bezug auf die Bodenwand vorsteht und nachgiebig verformt werden kann, wenn der Deckel (11) gegen die Fläche des Körpers (2) der Mine (1) gehalten ist.

3. Einrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die Bodenwand (15) eine ringförmige Nut (20) zur Aufnahme der Drahtfeder (12) aufweist.

4. Einrichtung nach Anspruch 3, dadurch gekennzeichnet, daß die Bodenwand (15) eine Einrichtung (24, 26) zur Positionierung der Feder (23) in bezug auf die Nut (20) aufweist.

5. Einrichtung nach Anspruch 4, dadurch gekennzeichnet, daß die Positioniereinrichtung im wesentlichen eine Brücke (24) aufweist, welche die Nut (20) teilweise abdeckt, um ein Anschlagelement im radialen Sinne gegen die Verschiebung der Feder (12) zu bilden.

6. Einrichtung nach einem der Ansprüche 4 oder 5, dadurch gekennzeichnet, daß die Positioniereinrichtung eine Bohrung oder eine Ausnehmung (26) aufweist, die einen gebogenen Kopfteil (25) der Drahtfeder (12) aufnimmt.

7. Einrichtung nach einem der Ansprüche 2 bis 6, dadurch gekennzeichnet, daß der erste Abschnitt (21) der Drahtfeder (12) eine deformierte Zone (27) aufweist, welche eine Teilinterferenzkupplung im radialen Sinne mit der Nut (20) festlegt.

8. Einrichtung nach einem der Ansprüche 2 bis 7, dadurch gekennzeichnet, daß die Drahtfeder (12) eine halbringförmige Ausbildung aufweist und daß die beiden Abschnitte (21, 22) in ihrer Länge im wesentlichen zueinander identisch sind.

9. Einrichtung nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß die Seitenwand durch eine Mehrzahl von Zungen (19) gebildet ist, die im wesentlichen in gleichförmiger Weise verteilt sind.

10. Einrichtung nach Anspruch 9, dadurch gekennzeichnet, daß die Bodenwand (15) des Deckels (11) eine im wesentlichen flache äußere Oberfläche aufweist und daß ein Durchgangsloch (16) einen Sitz bildet, um im Gebrauch einen Sensorteil (6) der Mine (11) aufzunehmen.

11. Einrichtung nach einem der Ansprüche 9 oder 10, dadurch gekennzeichnet, daß die Gelenkeinrichtung (32) zwischen einem Paar der Zungen (19), und zwar innerhalb zu der im wesentlichen zylindrischen Oberfläche angeordnet ist.

12. Einrichtung nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß die Gelenkeinrichtung, die den Zapfen (13) mit dem

Deckel (11) verbindet, wenigstens einen Draht (33, 34) aufweist, dessen entgegengesetzte Endteile in nachgiebiger Art und Weise mit der Bodenwandung (15) bzw. dem Zapfen (13) verbunden sind.

13. Einrichtung nach Anspruch 12, dadurch gekennzeichnet, daß die Gelenkeinrichtung im wesentlichen ein Gabelement (32) aufweist, welches zwei drahtförmige Arme (33, 34) aufweist, deren erste Enden mittels eines Brückenelementes (35) miteinander verbunden sind, um den Zapfen (13) zu halten und ferner entgegengesetzte freie Endteile aufweist, welche an der Bodenwandung (15) angehakt sind.

14. Einrichtung nach Anspruch 13, dadurch gekennzeichnet, daß das Brückenelement (35) einen inneren Schlitz (36) aufweist, in welchem der Zapfen (13) drehbar angeordnet ist, wobei der letztere an dem Brückenelement (35) mittels eines quer ausgerichteten Kopfteils (44) befestigt ist, welcher mit dem Element (35) interferiert, und daß ein Paar von Quervorsprüngen (46, 47) unterhalb des Querelementes (44) angeordnet und betätigbar ist, um das Brückenelement (35) elastisch so zu verformen, daß es durch den Schlitz (36) in einer solchen Art und Weise hindurchgeht, um das Brückenelement (35) zwischen dem quer angeordneten Kopfelement (44) und den Vorsprüngen (46, 47) des Zapfens (13) zwischengesetzt zu halten.

Revendications

1. Dispositif de sécurité pour l'activation de mines à semer, comprenant un couvercle (11) qui peut être monté sur le corps (2) de la mine (1), une goupille (13) pouvant être introduite dans un évidement radial (8) de ce corps pour verrouiller le mécanisme d'armement de la mine, et des moyens articulés (30) reliant cette goupille au couvercle pour permettre à celui-ci de se séparer du corps et d'extraire la goupille de son évidement, le couvercle ayant une structure pratiquement en forme de cuvette comportant un fond (15), et une paroi latérale (19) entourant le corps (2), caractérisé en ce que la paroi latérale (19) est délimitée extérieurement par une surface essentiellement cylindrique, d'où il résulte qu'on peut empiler une multiplicité de mines équipées de ce couvercle (11) dans un tube de lancement cylindrique (50), ce tube verrouillant ainsi la goupille (13) dans l'évidement (8) et le couvercle sur le corps (2), des moyens de ressort (12) étant reliés au fond (15) sur le côté qui, en utilisation, est en vis-à-vis du corps et exerçant une force élastique tendant à séparer le couvercle du corps lorsque la mine est expulsée du tube de lancement.

2. Dispositif selon la revendication 1, caractérisé en ce que les moyens de ressort (12) sont essentiellement constitués par un fil de ressort ayant une première portion (21) fixée sur le fond (15) et une deuxième portion (22) qui est en relief par rapport au fond (15) et qui peut être élastiquement déformée lorsque le couvercle (11) est maintenu contre la surface du corps (2) de la mine (1).

3. Dispositif selon la revendication 2, caractérisé en ce que le fond (15) comporte une gorge annulaire (20) pour recevoir le ressort (12).

4. Dispositif selon la revendication 3, caractérisé en ce que le fond (15) a des moyens de positionnement (24, 26) pour positionner le ressort (12) par rapport à la gorge (20).

5. Dispositif selon la revendication 4, caractérisé en ce que ces moyens de positionnement comportent essentiellement un pont (24) qui recouvre partiellement la gorge (20) pour constituer un élément de butée dans le sens radial contre le déplacement du ressort (12).

6. Dispositif selon la revendication 4 ou la revendication 5, caractérisé en ce que les moyens de positionnement comportent un trou (26) qui reçoit une portion terminale coudée (25) de ce fil de ressort (12).

7. Dispositif selon l'une des revendications 2 à 6, caractérisé en ce que la première portion (21) du ressort (12) a une zone déformée (27) qui constitue une liaison partielle par interférence dans le sens radial avec la gorge (20).

8. Dispositif selon l'une des revendications 2 à 7, caractérisé en ce que le ressort (12) a une forme semiannulaire et en ce que les deux portions (21, 22) ont des longueurs essentiellement identiques.

9. Dispositif selon l'une des revendications précédentes, caractérisé en ce que la paroi latérale est constituée par une multiplicité de languettes (19) réparties de manière essentiellement uniforme.

10. Dispositif selon la revendication 9, caractérisé en ce que le fond (15) du couvercle (11) a une surface extérieure essentiellement plane et une

ouverture traversante (16) définissant un siège pour recevoir, en utilisation, une portion de détection (6) de la mine (1).

11. Dispositif selon la revendication 9 ou la revendication 10, caractérisé en ce que les moyens articulés (32) sont logés entre une paire de languettes (19) à l'intérieur de la surface essentiellement cylindrique.

12. Dispositif selon l'une des revendications précédentes, caractérisé en ce que les moyens articulés reliant la goupille (13) au couvercle (11) comportent au moins un fil métallique (33, 34) dont les portions terminales opposées sont reliées de manière amovible respectivement au fond (15) et à la goupille (13).

13. Dispositif selon la revendication 12, caractérisé en ce que les moyens articulés comportent essentiellement un étrier (32) ayant deux bras (33, 34) constitués par un fil métallique, ayant des premières extrémités reliées ensemble au moyen d'un pont (35) supportant la goupille (13) et ayant des extrémités opposées libres qui s'accrochent sur le fond (15).

14. Dispositif selon la revendication 13, caractérisé en ce que le pont (35) a une fente intérieure (36), à l'intérieur de laquelle la goupille (13) peut tourner, cette dernière étant fixée au point (35) au moyen d'une tête transversale (44) qui interfère avec ce pont (35), et au moyen de deux languettes latérales (46, 47) disposées en dessous de cette tête transversale (44) et pouvant déformer le point (35) pour passer élastiquement à travers la fente (36) de façon à maintenir le pont (35) interposé entre la tête transversale (44) et les languettes (46, 47) de la goupille (13).

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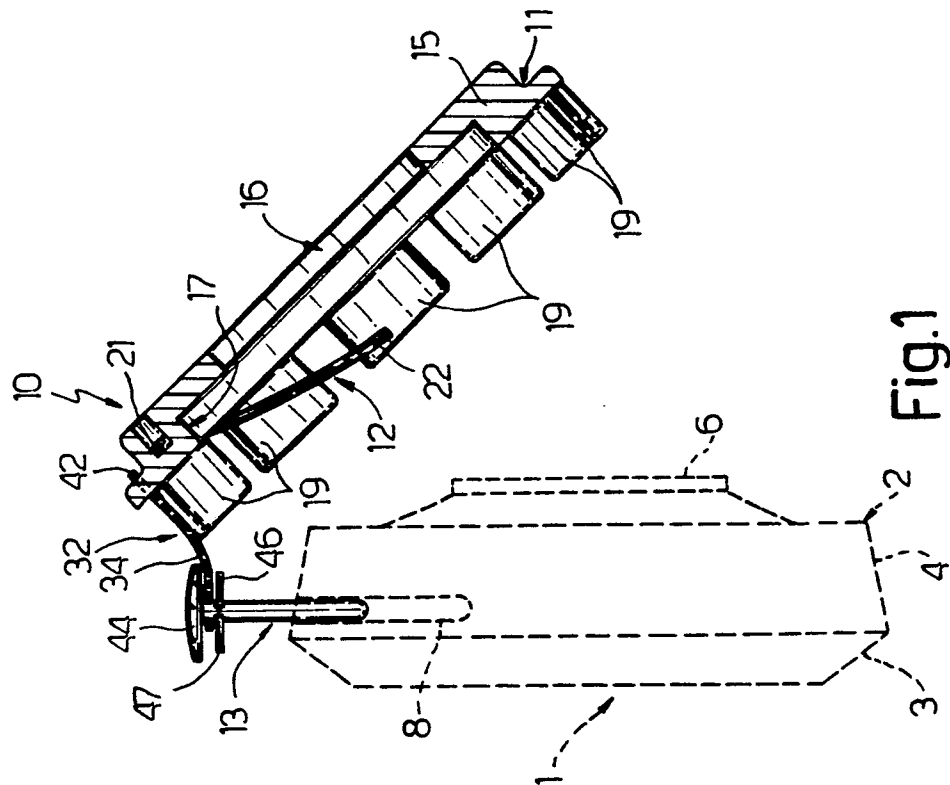


Fig. 1

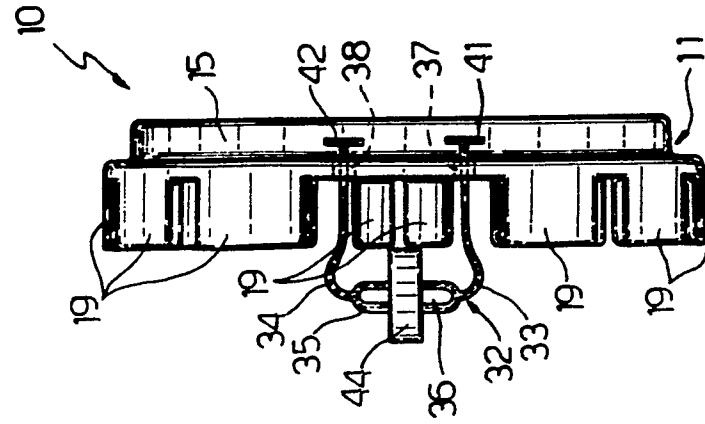
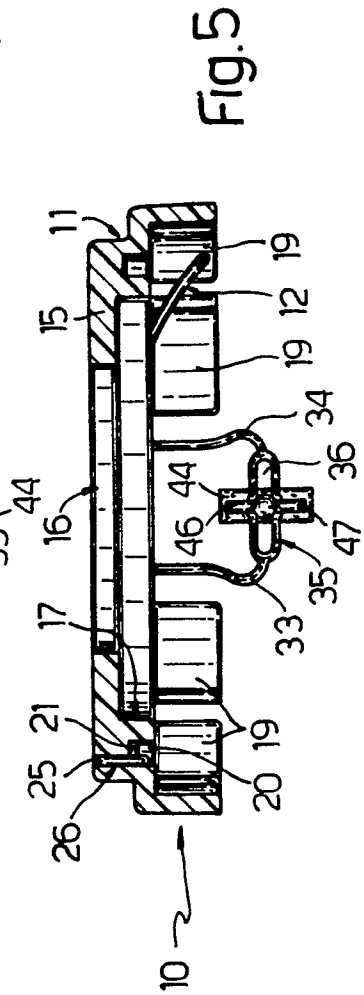
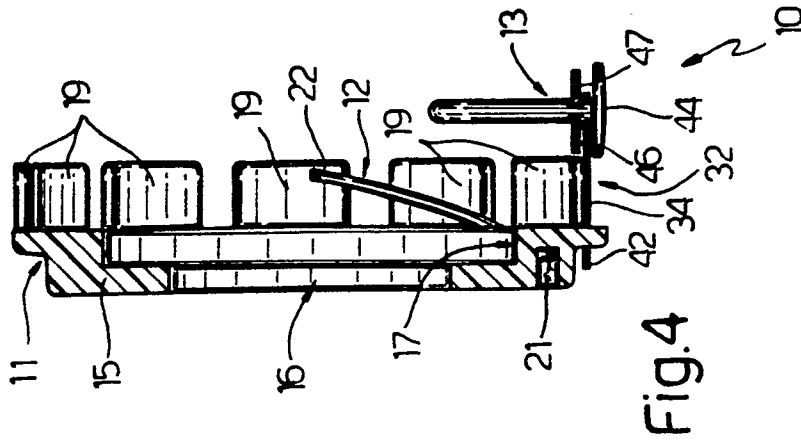
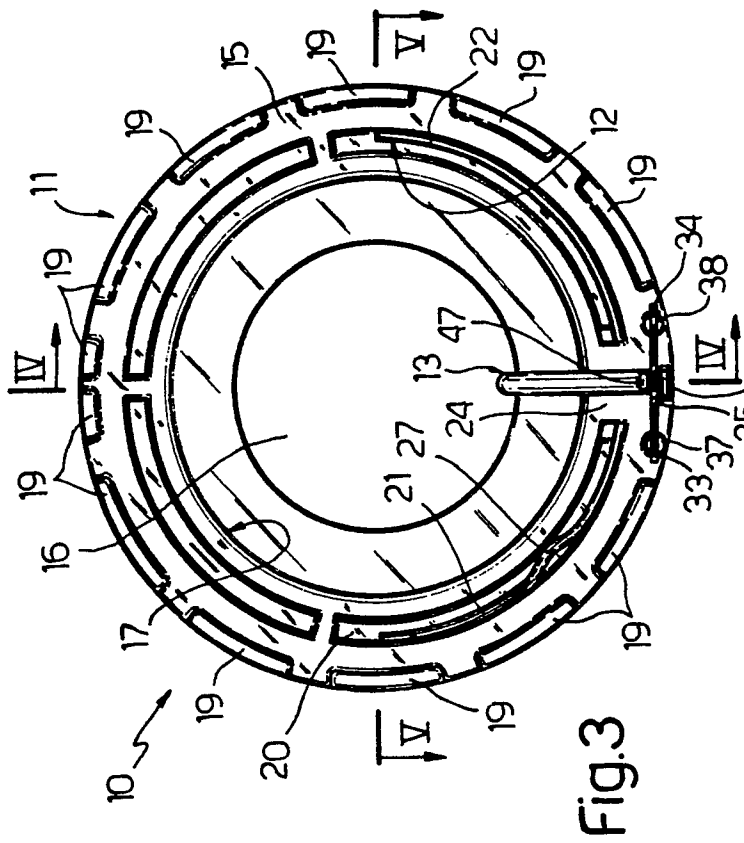


Fig. 2



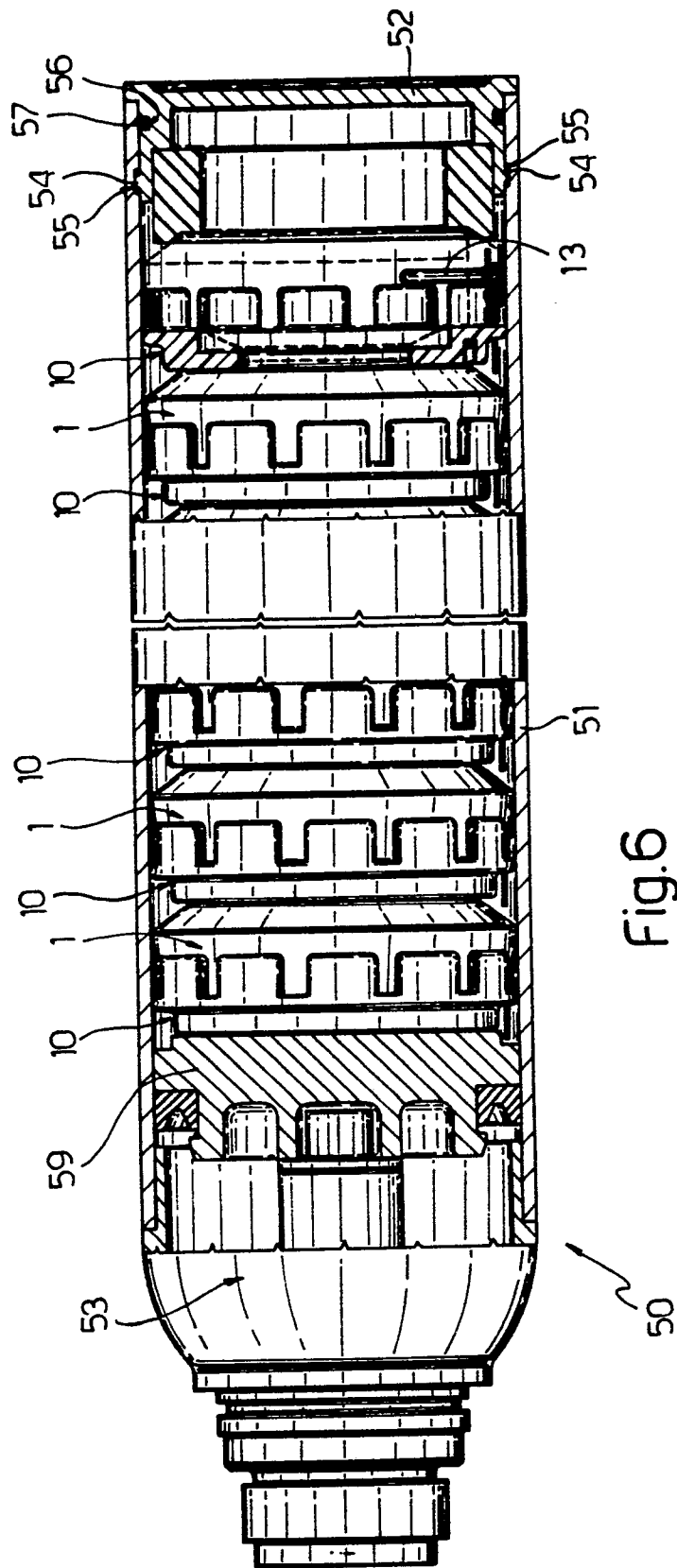


Fig.6