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(12) # EUROPEAN PATENT APPLICATION

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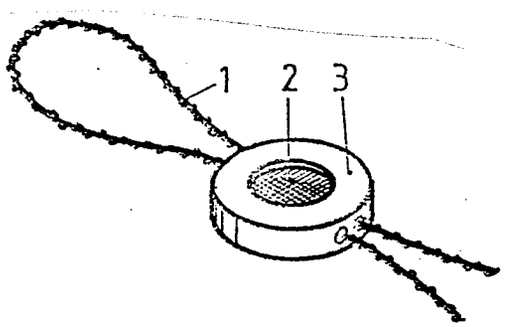
(54) **Sealing device comprising a plumb.**

(57) The sealing device comprises an annular disc with the plumb received in the annular opening thereof. The disc is manufactured of a material which irreversibly changes in shape and/or colour when forces are imparted thereto for infringing the seal (stress-whiting).

Projections are provided on the plumb and corresponding recesses in the disc so that the plumb is placed automatically in the correct position in the disc, whereby apertures in both for passing a sealing chord are aligned.



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Title: Sealing device comprising a plumb.

The invention relates to a sealing device comprising a plumb having a sealing chord, the plumb being received in the annular aperture of an annular disc, openings being provided in the disc and in the plumb for the passage of the legs of the sealing chord. Such a sealing device is known from the DE-C 638.743. Such devices serve for sealing certain apparatus and spaces, e.g. gas flow meters, Watt meters and water meters. Also Government Standards Offices for many situations use the plumb for sealing computing apparatus suitable for commercial purposes. Furthermore the customs offices use such sealing devices for sealing several spaces or stores.

The known sealing devices are structurally designed such that an unseparable connection is established between the loop shaped sealing element, e.g. a sealing chord carrying a plumb and the object to be sealed,by means of a pair of sealing pinchers.

However, this structure, which is simple per se, has the disadvantage that the seal may be broken by simple means in order to fraud on the sealed object. One tries, once the frauding operation has been carried out, to carefully reset the seal in its original condition such that the infringement doesn't show. With a view to the defects and/or disadvantages related with the known prior art, the invention aims at providing a sealing device whereby the infringement of the plumb is immediately observed by the competent authorities.

This is achieved according to the invention in that the disc is manufactured of a material which irreversably changes in shape or colour if thereon forces are imparted for breaking the seal. Such forces may e.g. be imparted by means of a pair of pincers. This phenomenon is also known as stress-whiting. Polysterene, which may be coloured or not coloured, is suitable therefor, but also other material may be used.

The invention furthermore aims at facilitating the provisior of said sealing device. For it is that the plumb has to be placed in

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the disc such that the through openings therein become situated opposite to those in the disc in order to permit threading of the sealing loop chord.

This is achieved according to the invention in that one or more projections are provided on the plumb circumference and the corresponding recesses in the inner circumference of the disc, or projections on the inner disc circumference and recesses on the plumb circumference respectively have been provided.

Said projections are provided such that the openings for threading the sealing loop are aligned thereby.

Within that scope an embodiment is possible, in which two projections are diametrally provided on the plumb and extend through the full thickness or height of the plumb. In that case it does not matter from which end surface of the disc the plumb is entered. A disadvantage thereof might be that the plumbdrops through the disc if this is not placed on a support or the annular aperture is not closed at the side opposite to the entering surface by means of the fingers of the person placing the disc.

This disadvantage is removed when two projections have been diametrally provided on the plumb, which extend through substantially half the thickness of the plumb and end adjacent to one of the end surfaces of the plumb.

The falling through of the plumb may also be prevented when the projections have an outer surface forming a sharp angle with the plumb axis.

In order therewith yet to permit entering the plumb from both disc end surfaces, the corresponding recesses in the disc may extend through half the disc thickness, starting from one disc end surface, while identical recesses are provided in the other half of the disc thickness and starting from the other disc end surface.

Entering the plumb into the disc per se may be facilitated when the projections are in the shape of half spheres, the sphere center thereof being substantially in the circumferential surface of the plumb, whereas the recesses are half cylindrical and

open into at least one of the disc end surfaces.

The spherical shape provides an aiming possibility whereby if the diametral directions of the projections and the recesses initially not completely coincide when the plumb is placed, the correct position is obtained through the aiming action.

The falling through of the plumb is prevented if therewith the recesses in the disc terminate at a position spaced from one of the disc end surfaces.

The invention will hereunder be further illustrated with reference to the drawing showing a number of embodiments, given as examples, of the sealing device according to the invention.

Figure 1 shows the sealing device carrying the threaded sealing loop.

Figure 2 shows the part of the sealing device prior to assembly thereof.

Figure 3a is a perspective view at an enlarged scale of a plumb having a first embodiment of the projections.

Figure 3b is a corresponding section through this plumb when provided in a disc.

Figure 4a shows in perspective a plumb having projections extending through half the thickness of the plumb, whereas figure 4b is a section through the plumb present in the corresponding disc.

Figure 5a shows a perspective view of a plumb having again different projections and in figure 5b a section is shown through said plumb in a corresponding disc.

Figure 6a shows a plumb having spherical shaped projections and

Figure 6b shows a section of said plumb in a corresponding disc.

Figure 1 and 2 show the sealing device, the projection and recesses of which according to the invention are not visible or not shown respectively.

Said sealing device has been assembled from a sealing

chord 1, a sealing plumb 2 and a sealing disc 3. The chord 1 is threaded through eyes (not shown) provided on the apparatus to be sealed, such that said eyes are kept together by the sealing chord so that the apparatus may not be opened. After threading through the eyes the plumb and the disc are threaded onto the thread. The disc 3 thereto is provided with an annular aperture 4 of such form and dimensions that the plumb 2 therein fits freely or with an interference fit. The disc 4 has one or more apertures 5, 6 extending parallel to a radius thereof and provided as through bores of the disc, each time a bore 5 at one side being aligned with a bore 6 at the diametrally other side of the disc.

The plumb 2 has one or more recesses 7, in the embodiment shown a single elongate recess extending transversely to the axis of the cylindrical plumb.

Each end of the thread is threaded through an aperture 5, through the recess or aperture 7 in the plumb after this has been placed in the annular opening of the disc, and through the bore 6 of the disc aligned therewith. If thereafter a clamping force is imparted to both end surfaces of the plumb by means of a pair of pincers, the plumb is clamped to the thread and in the disc 3 in that the plumb is pressed in engagement with the wall of the annular opening in the disc. It is preferable to form a chamber or undercut edge in said inner wall of the opening such as is also provided in known sealing devices. This has not been shown in figures 1 and 2.

It will be clear that the disc and the plumb may also have a different shape from the circular cylindrical shape as shown.

According to the invention the plumb is provided with in this case two diametral projections and the disc with corresponding recesses or vice versa, the disc with the projections and the plumb with the corresponding recesses. In figures 3 - 6 the embodiments are shown wherein the plumb has the projections.

Fig. 3a shows a cylindrical plumb 2, having a through going recess 7. According to figure 3a two diametrically opposite projections 8 are provided on the plumb, said projections being substantially half cylindrical in shape and are integral with the plumb 2 proper. The projections 8 extend through the complete thickness of the plumb. In the disc 3, which is shown in diametral section in figure 3b, corresponding recesses 9 are provided.

Figure 4a shows the same projections, here indicated by the reference number 10, on a plumb 2, however, said projections extend through half the height or thickness of the plumb. The corresponding recesses in the disc 3 are indicated with the reference number 11, whereas the annular opening in the disc has a circumferencial undercut edge 12, while moreover a chamber 13 has been formed therein. However, it is also possible to form projections 12 only at the position of the recesses 11.

Figure 5a shows a plumb having two diametral projections 14 which are substantially half cones, the apex of which is contained in one end surface and the base in the other end surface of the plumb. The corresponding disc according to figure 5b here has corresponding half conical recesses 15' in the upper part, extending through half the height or thickness and extending according to the same apex angle as the projections 14, the plumb 2 with its projection being supported therein only through half the height, the remainder of the projections extending freely in a chamber of the disc 3. Preferably corresponding recesses 15" are provided in the lower part of the disc, having the same apex angle, so that the plumb may also be placed in the disc 3 when in reverted position. Furthermore here the disc has been shown as having a chamber 16 for receiving the outwardly pressed plumb material.

Fig. 6 finally shows in figure 6a a plumb 2 having diametral projections 17, which are substantially shaped as half spheres which are integrally connected with the sectional surfaces adjacent to and with the plumb. The corresponding disc 3 has through going half cylindrical recesses 18, having a slightly larger radius than the sphere radius. The edges of the central disc opening may be rounded in the disc end surfaces at 19 in order to further the aiming action of the projections 17.

The disc 3 is shown here as having a chamber 20, which is V-shaped in section and adapted for receiving plumb material when the plumb is pressed into the disc.

As said, it is also possible to have the projections 17 not extending through the complete height of the plumb, the disc

opening having at the one end surface an undercut edge (not shown) on which the projections (17) become supported when the plumb is placed into the disc. In that case the plumb cannot drop through the disc or does not require to be supported in order to prevent dropping through. The disc 3 may have any shape of its outer circumference, which facilitates handling thereof by a machine for providing the plumbs in the disc, e.g. circular, but having two straight portions, or provided with notches or projections.

Also the disc may have inward projections, relative to a circular shape, when the opening in the disc is triangular or has any other shape, in which case the plumb should have a circumferential shape corresponding therewith.

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CLAIMS

1. Sealing device comprising a plumb (2), having a sealing chord (1), the plumb being received in the annular opening (4) of an annular disc (3), wherein recesses (5, 6) for the passage of the sealing chord legs (1) are provided in the disc (3) and in the plumb (2), characterized in that the disc (3) is manufactured of a material, which irreversibly changes in shape or colour when forces are imparted thereto for infringing the seal.

2. Device according to claim 1, characterized in that two projections (8) are provided diametrally on the plumb (2), said projections extending through the full height or thickness of the plumb (2).

3. Device according to claim 1, characterized in that two projections (10) are diametrally provided on the plumb (2), said projections extending through substantially half the thickness of the plumb and ending adjacent to one of the end surfaces of the plumb.

4. Device according to claim 1, characterized in that the projections (14) have a circumferential surface including a sharp angle with the axis of the plumb (2).

5. Device according to claim 4, characterized in that the corresponding recesses (15') in the disc (3) extend through half the thickness of the disc, starting from one end surface of the disc, identical recesses (15") being provided extending through the other half of the thickness of the disc (3) and starting from the other end surface of the disc.

6. Device according to claim 1, characterized in that the projections (14) are in the shape of half spheres, the sphere centre of which is substantially contained in the circumferential surface of the remaining circumference of the plumb (2), the recesses (18) being half cylindrical and opening into at least one of the end surfaces of the disc.

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7. Device according to claim 1, characterized in that the projections of the plumb and/or the disc are shaped in that the plumb circumference and the inner wall of the disc aperture (4) have a mutually corresponding shape which differs from a circular shape.

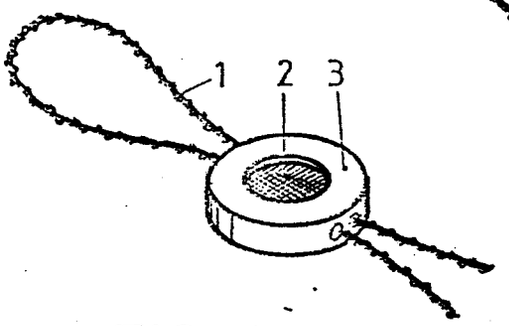


FIG. 1

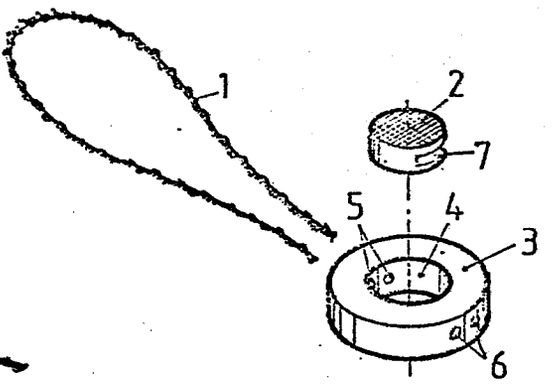
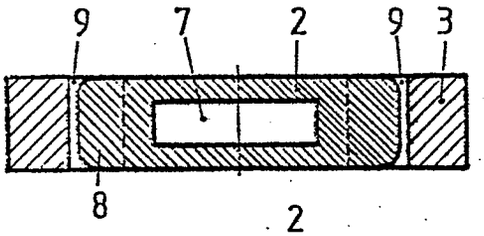


FIG. 2

FIG. 3b



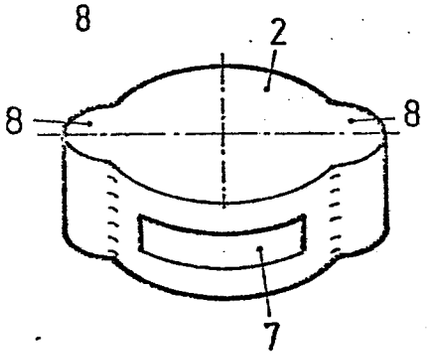
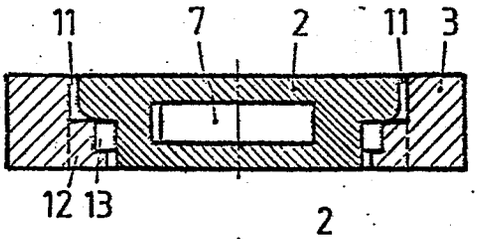


FIG. 3a

FIG. 4b



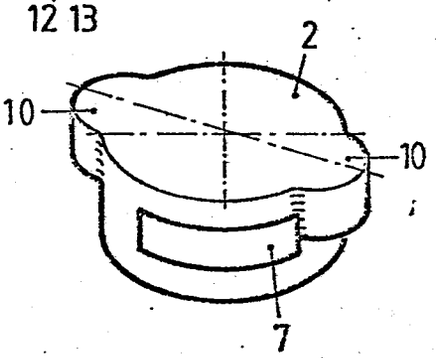
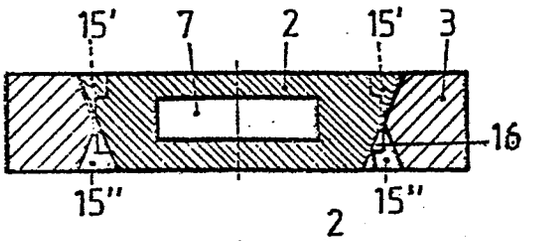


FIG. 4a

FIG. 5b



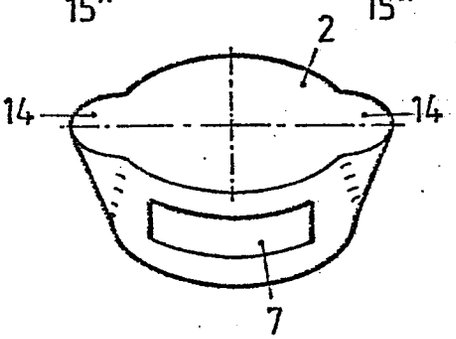
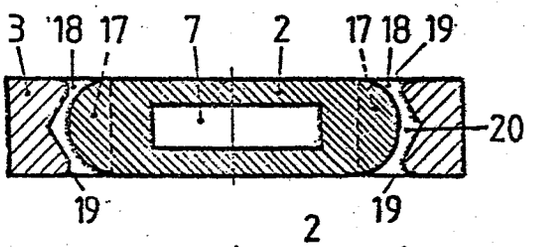


FIG. 5a

FIG. 6b



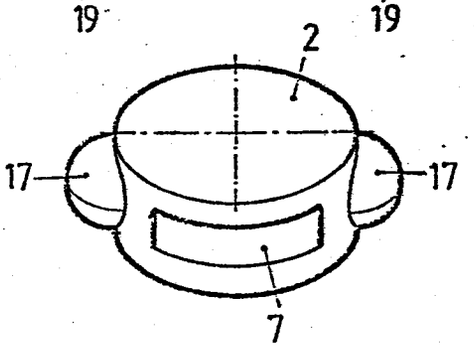


FIG. 6a

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EUROPEAN SEARCH REPORT

0130657

Application number

EP 84 20 0979

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. ³)
Y	FR-A- 602 630 (SZTANCSA et al.) * Figures 1-10; page 1, lines 43-60; page 2, lines 1-55 *	1	G 09 F 3/03
A		2,6,7	

Y	US-A-2 884 123 (AMERICAN HOME PRODUCTS CORP.) * Figures 7,8; column 1, lines 29-36; column 2, lines 38-72; column 3, lines 1-4 *	1	

A	FR-A- 808 112 (DYGULA) * Figure 3 *	5	
	---		TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
A	FR-A- 559 437 (MOLINA et al.)		G 09 F

A,D	DE-C- 638 743 (FRANK)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	04-10-1984	ALLEN E.F.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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