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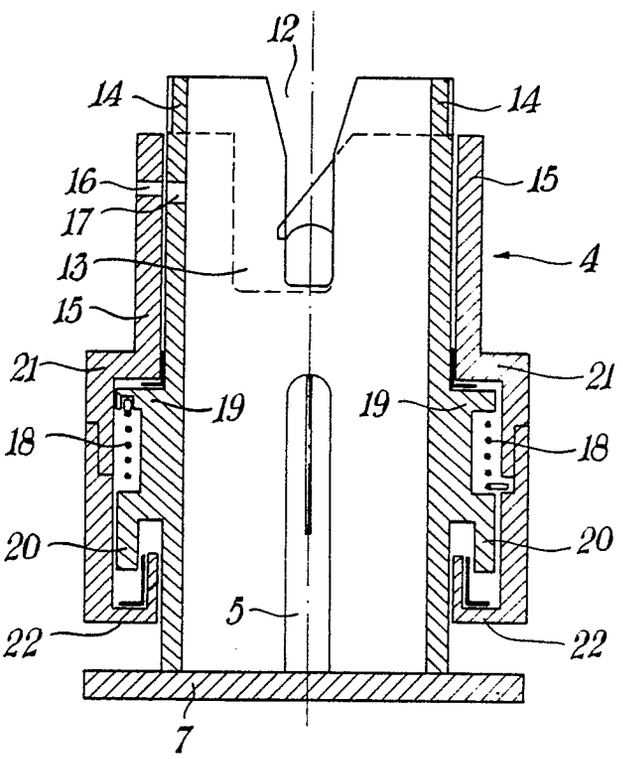
(54) A high safety connection device for grounding systems.

(57) A high safety connection device for grounding systems, characterized in that it is made up of a female member comprising a first inside sleeve (14) which is provided with pin means, a second outside sleeve (15) and spring means (18), which last are interposed betweeb said first and second sleeve; of a male member realized with an insulating material which is provided externally with tongue means (3) and internally with a small cylinder realized with a conductive material, in which cylinder two spaced and opposed seats are obtained for housing said pin means as well as a grounding cable; and of anchoring means which are provided on said female member at the lower part of the same; shaped slip means (12,13) being provided on said first and second sleeve for housing said tongue means and for coupling with the same.

Fig. 2



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A HIGH SAFETY CONNECTION DEVICE FOR GROUNDING SYSTEMS

This invention relates to a high safety connection device for grounding system.

More particularly, this invention relates to a quick connection device for said systems, said device being of the manual insertion type and provided with an automatic locking system, and made up so as to warrant a high safety against fires and/or explosions as well as any possible casual disconnecting or release of said device.

It is quite evident that safety is very important when carrying out operations in which thanks, tank trucks, aeroplanes, and the like are involved, and more generally when the supply is involved of inflammable and/or explosive materials, as a spark caused by the electrostatic charges built up can be very harmful.

It is quite clear from the above that grounding systems employed at the present time, for instance those employing a clamp with the relate grounding cable, or those providing the coupling between a pin on the tank to be supplied and an insulated sleeve that is connected to a grounding cable, are not capable of satisfying the needs for safety and the safety standards set forth by labor legislation.

More particularly, the first of the systems mentioned above does not provide any insulating protection type, and it is also subject to the mechanical defects which are characteristic of the clamps employed.

The employment of the second system involves the risks of an imperfect return of said pin to the original position at the dis connecting or release moment, so that when a second utilization occurs, the electric discharge takes place at the contact with the tank. Moreover, such a system, in addition to the impossibility of inspecting said pin for its actual contact with the grounding cable, also involves the risk of casual disconnecting or release of the device, because no connection means is provided capable of assuring a suitable safety locking.

The device according to the present invention can be advantageously introduced in that field of problems, as such device obviates the drawbacks mentioned above by realizing a high safety connection system which is substantially made up of a male member and a female member which can be coupled according to the technical teachings disclosed in the Italian Patent No. 49193-A/84 (Sandro Pettinari).

By employing said device, advantageously in addition to obtaining a safe coupling that avoids any casual disconnecting, which is the main feature of the system according to the Patent disclosure mentioned above, also a reliable contact is obtained between said two members of the grounding system and at the same time the certainty is obtained that no sparks occur outside the insulated device in the presence of vapors of inflammable and/or explosive materials.

Thus, it is a specific object of the present invention a high safety connection device for grounding systems, which is characterized in that it is made up of a female member comprising first inside sleeve means provided with pin means, second outside sleeve means and spring means which are interposed between said first and second sleeve means; of a male member realized with an insulating material, which is externally provided with tongue means and inter nally with small cylinder means realized with a conductive material, in which cylinder two spaced and opposed seats are obtained for housing said pin means as well as a grounding cable; and of anchoring means provided on the female member at the lower part of the same, shaped slit means being also provided on said first and second sleeve means for housing said tongue means and for coupling with the same.

Again according to the present invention, a groove is provided on said first inside sleeve means and a through hole is provided on said second outside sleeve means for the insertion of the pin means which engage with said groove.

Advantageously according to the present invention said shaped slit means and said groove allow the relative rotation of said female member and said male member through an angle of at least 10°.

Moreover, a number of tongue means is provided higher than 1 advantageously on said male member, while an equal number of shaped slit means is provided on said first and second sleeve means, in order to realize a tonguing with said slits and tongues.

Further, a conductive member can also be provided in the connection device according to the present invention, said conductive member being connected to said small cylinder means realized with a conductive material, for linking said device to a processor for controlling the loading and unloading operation of the inflammable material.

Moreover, said grounding cable can be connected to a conductive member which in turn is connected to said small cylinder means and protrudes from said male member.

The present invention will be disclosed in the following with particular reference to the enclosed drawings, in which:

Figure 1 shows a side view of a longitudinal section of the male member of the device according to the present invention; and

Figure 2 shows a side view of a longitudinal section of the female member of the device according to the present invention; and

Figure 3 shows a longitudinal section of an embodiment of the male member.

According to the embodiment of the present invention illustrated in the drawings, reference 1 indicates the external structure of the male member 2 realized with an insulating material (shown in dashed line), while reference 3 indicates the coupling tongues of the male member 2 for coupling with the female member 4 (Figure 2).

By inserting said male member 2 into the female member 4, the pin 5 inserts into the suitable seat 6 obtained on said male member 2. Said pin 5 in the embodiment shown is fastened to an anchoring base 7 for joining said female member 4 to a tank to be supplied with the inflammable material - (the tank is not shown). The pin 5 goes through a first small metal cylinder 8 and next it ends its run in a second small metal cylinder 9.

A second seat 10 is provided at the other end of said small cylinder 9, the seat 10 being for housing a grounding cable (not shown). The contact between said pin 5 and the grounding cable is established through said small cylinder 9.

An insulating material closing means is shown by number 11, which is provided above said small cylinder 9.

The coupling between the male member 2 and the female member 4 occurs through the insertion of tongues 3 into the suitably shaped seats 12 and 13 obtained on the inside sleeve 14 and on the outside sleeve 15, said sleeves making the female member 4. A through hole 16 is provided on said outside sleeve 15 in correspondence to a groove 17 whose width is of at least 10°, said groove 17 being obtained on said inside sleeve 14.

A spring 18, provided between the sleeve 14 and the sleeve 15, is loaded manually and then a pin (not shown) is inserted into said through hole 16, which pin, by engaging with said groove 17, will keep the spring loaded, so as to allow in addition a relative rotation of the sleeve 15 with respect to the sleeve 14 through an angle equal to the angular width of said groove 17.

Said sleeve 14 as well as said sleeve 15 are respectively provided with the alignment of striker means 19, 20 and 21, 22 which govern their axial stroke.

By inserting the male member 2 into the female member 4, the tongues 3 will engage into an equal number of slits 12 and thereafter, by exerting a pressure and a simple rotation, into the slit 13, in the position shown at 23, so that the contact between the pin 5 and the grounding cable is set up.

A simple axial pull will be enough for causing the release if a rotation in the inverted sense to the preceding one is performed.

Figure 3 shows the pole 24 for making the connection with a processing unit (not shown) for controlling the unloading operations of the inflammable material.

Said pole 24 is connected to the small metal cylinder 8.

In that embodiment of the present invention, the contact of said pin 5 with the grounding system is obtained through the pole 25 protruding at the upper part from said male member 2.

The present invention has been disclosed according to some preferred embodiments of the same, but it is to be understood that modifications and changes can be introduced in the same by those skilled in the art without departing from its spirit and scope for which a priority right is claimed.

Claims

1. A high safety connection device for grounding systems, said device being characterized in that it is made up of a female member comprising first inside sleeve means provided with pin means, second outside sleeve means, and spring means which are interposed between said first and second sleeve means; of an insulating material male member provided externally with tongues means and internally with small cylinder means realized with a conductive material, in which cylinder two spaced and opposed seats are obtained for housing said pin means and a grounding cable; and of anchoring means provided at the lower part on the female member; shaped slit means being provided on said first and second sleeve means for housing said tongue means and for coupling with the same so as to form a tonguing.

2. A high safety connection device for grounding systems according to claim 1, in which device a groove is provided on said first inside sleeve means, and a through hole is provided on said second outside sleeve means for inserting said pin means which engage with said groove.

3. A high safety connection device for grounding systems according to claim 1, in which device said shaped slit means and said groove allow a relative rotation of said female member and said male member through an angle of at least 10°.

4. A high safety connection device for grounding systems according to claim 1, in which device said tongue means for realizing a tonguing are provided in number higher than one, and an equal number of shaped slit means are provided on said first and second sleeve means.

5. A high safety connection device for grounding systems according to claim 1, said device being characterized in that a conductive member is provided which is connected to said small metal cylinder means and which can be connected to processor means.

6. A high safety connection device for grounding systems according to claim 1, which device is characterized in that the grounding cable is connected to a conductive member protruding from said male member and connected to said small cylinder means.

Fig. 2

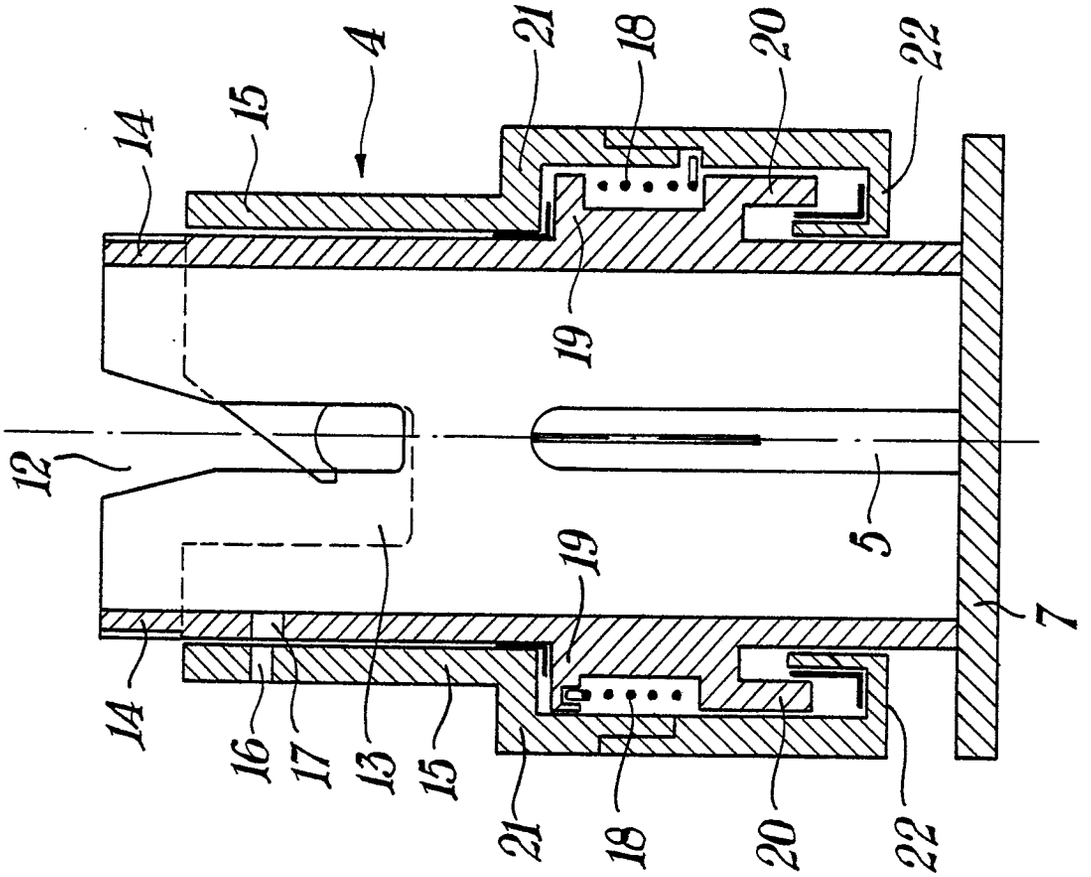
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Fig. 1

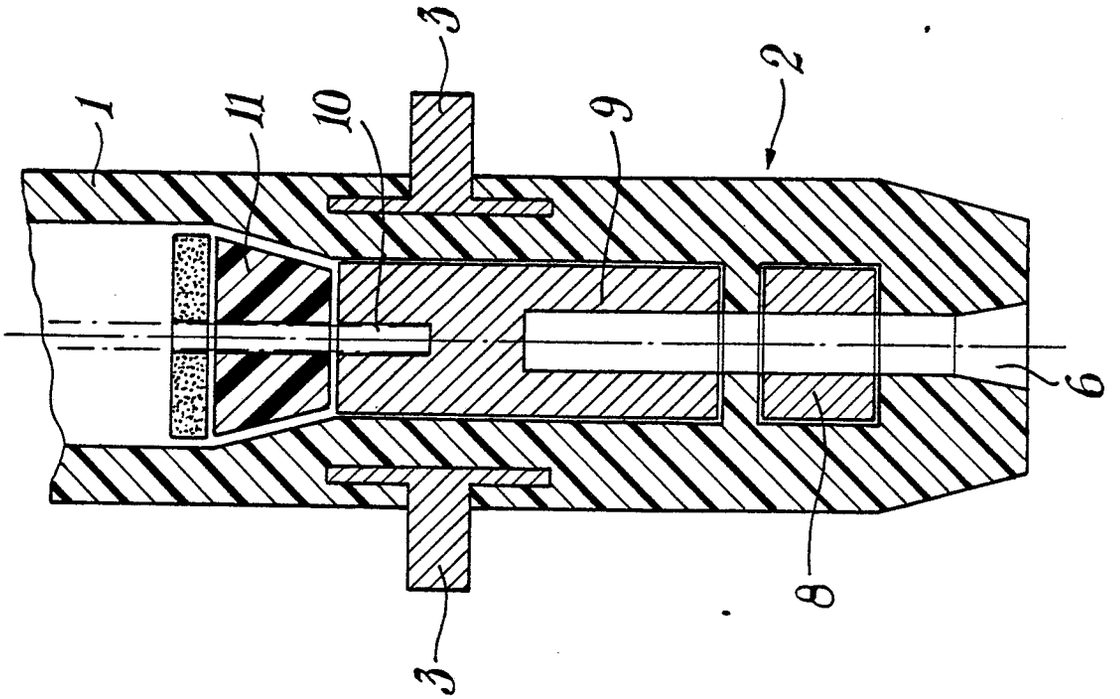
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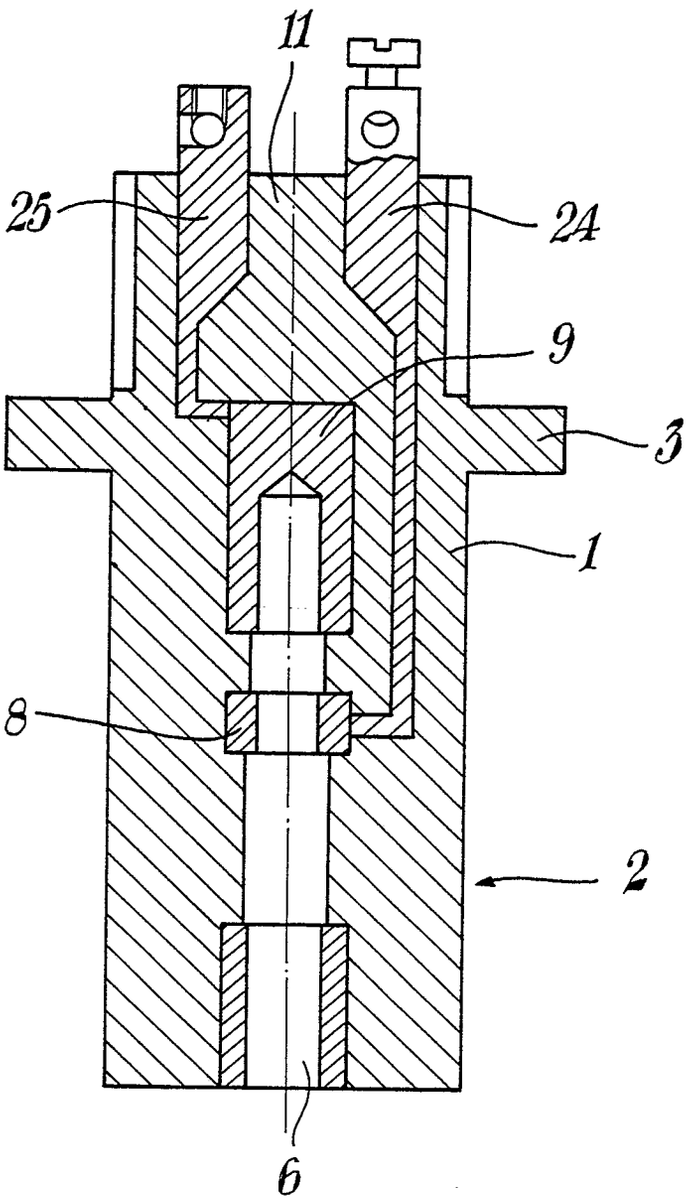
Fig. 3



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EUROPEAN SEARCH REPORT

Application number

EP 86 83 0035

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.4)
A	SOVIET INVENTIONS ILLUSTRATED, Section Electrical, Week J48, 19th January 1983, abstract no. A5448 J/48, Derwent Publications Ltd., London, GB; & SU - A - 912 633 (GREBENYUK A I) 22-04-1980	1	H 01 R 13/648 H 01 R 4/00
A	FR-A-2 270 695 (S.E.P.M.) * page 4, line 6 - page 5, line 16; figures 1-5 *	1,4	
A	CH-A- 372 720 (G.W. EPPRECHT) * page 2, lines 100-110; figure 1 *	1	
A	DE-A-2 951 455 (PLESSEY HANDEL UND INVESTMENTS) * page 9, lines 14-20; figure 1 *	1,2,4	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

H 01 R 13/00
H 01 R 4/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	29-09-1986	LEOUFFRE M.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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L : document cited for other reasons

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