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FLASH ARRESTER FOR GAS CONDUITS

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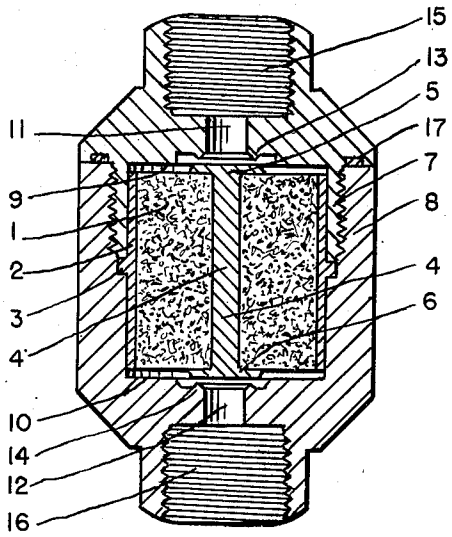


FIG. 1.

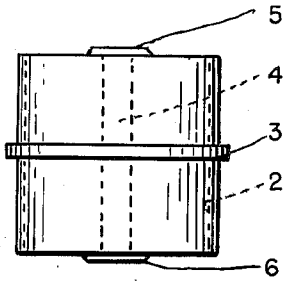


FIG. 2.

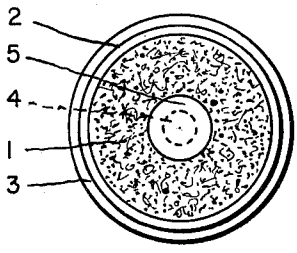


FIG. 3

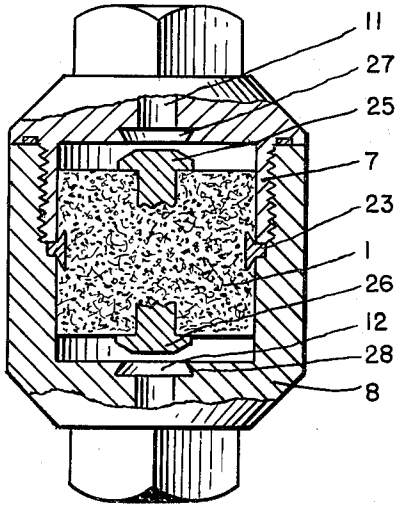


FIG. 4.

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FLASH ARRESTER FOR GAS CONDUITS

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The present invention refers to a flash arrester adapted to be inserted into a gas conduit, preferably an acetylene conduit, so as to arrest an explosion wave propagated in the conduit. The invention concerns itself particularly with providing a flash arrester of reliable function and simple, practical and economical in construction, which is easily put together without the possibility of an error occurring in the mounting of the parts of the arrester.

A flash arrester with a passage for a gas stream including a solid, porous body, is characterized according to the invention in that the solid, porous body is suspended between a pair of valve apertures for admitting the gas stream to the said passage and allowing it to escape therefrom, the solid, porous body carrying opposite the valve apertures at a short distance therefrom gas-tight sealing members and the suspension members for the solid porous body allowing when subject to explosive pressure a displacement during deformation of the suspension member of the solid porous body until one sealing member closes one of the valve apertures. The suspension member as well as the gas-tight sealing members are preferably of soft metal, such as lead.

The invention is illustrated on the attached drawing in the form of a pair of embodiments shown by way of example. FIG. 1 shows an axial section of a flash arrester according to the invention. FIGS. 2 and 3 show different views of a solid, porous body forming part of the arrester. FIG. 4 shows partially in axial section a part of the flash arrester in a modified construction.

According to the embodiment of FIGS. 1 to 3, the flash arrester comprises a solid, porous body **1** of fire-resistant material such as so called ceramic filter. A very suitable substance for the porous body is the sort utilized for abrasive disks, but other natural or artificial granular stone substances, which have been brought into a solid porous form by one means or the other, can also be used. Fine metal granules may also be used instead of sand particles, probably without additional advantage. A suitable value for the porosity of the porous body **1** is one resulting in a pressure drop of 25 mm. Hg at a gas flow of about 800 litres per minute.

The body **1** is cylindrical and onto its cylindrical outer face there is cast a lead armour **2**, which, besides forming a shell surrounding the body **1**, is formed with a circumferential flange **3**. Centrally in the body **1** there is a boring **4** filled with a lead casting forming a pair of terminal sealing members **5**, **6**. These are cast in massive form and do not let through the gas.

The body **1** with its armour **2**, **3** is placed in the two halves **7** and **8** of a valve housing so that the flange **3** is held by axial pressure between shoulders on the two halves **7**, **8**, the arrangement being such that the terminal faces of the body **1** are spaced a short distance away from each bottom **9** and **10** in the passage formed in the valve housing halves at the same time as the terminal sealing members **5**, **6** are placed a short distance away from the valve apertures **11**, **12** in each bottom **9**, **10**, as clearly shown by FIG. 1. These valve apertures **11**, **12** are each surrounded on the side thereof facing the sealing members **5**, **6** by a sharp annular projection or ridge **13** or **14**, respectively, and are joined on the other side to fittings **15** and **16** for attachment to pipes. In addition to the tightening between the valve housing halves provided by the

flange **3** there is further an aluminium ring **17** serving the same purpose.

The flash arrester just described is adapted to be inserted for instance into a high-pressure acetylene line. The arrester then allows the acetylene to flow through it with little flow resistance in the porous body **1**. Since the flange **3** is held by pressure, a blockage or tightening is obtained here against the valve housing on the outside of the armour **2** and it is not necessary for the armour proper to tighten against the valve housing halves but a sliding fit may be provided here. The flange **3** is strong enough to withstand easily without deformation the greatest pressure loads on the body **1** caused by pressure fluctuations in the gas occurring in normal operation. For instance, if the greatest pressure variations are 25 atmospheres overpressure, the flange **3** should preferably be able to retain the body **1** without displacement even at or immediately below twice this pressure. If an explosion wave penetrates into the line containing the flash arrester and a pressure wave, for instance of 800 to 1000 atmospheres overpressure, hits the body **1**, for instance on the upper side thereof as shown in FIG. 1, a deformation of the flange **3** at its attachment to the armour **2** takes place and the body **1** is pressed with its sealing member **6** against the annular ridge **14** and closes the valve aperture **12**. The porous body **1** absorbs the explosion or, in other words, causes the acetylene dissociation to stop. The body **1** is then heated and if the gas were allowed to continue to flow a renewed acetylene dissociation could occur and proceed through the valve aperture **12** to the line beyond it. However, this is effectively prevented, since the valve aperture **12** has been closed by the sealing member **6** and the gas flow has been stopped. The solid porous body **1** thus serves not only to stop the acetylene dissociation but also to cause a mechanical blockage of the gas line at its location. When the porous body **1** has been exposed to an explosion it is obviously consumed and has to be replaced by a fresh one, which is easily done by screwing apart the halves **7**, **8** of the valve housing. When mounting the body **1**, it is entirely impossible to turn it or insert it incorrectly, which is an important feature.

It will now be clear that the essential feature of the invention is that the solid porous body is provided with gas-tight sealing members exactly opposite each valve aperture and that the solid porous body is suspended with the sealing members at a short distance from the valve apertures by means of some suspension member which, upon exposition of the solid porous body to an explosion wave, is deformed or broken and allows a displacement of the solid porous body in the direction of flow of the explosion wave, irrespective of the direction from which the said wave hits the flash arrester, so that the corresponding sealing member is made to engage and seal off its valve aperture.

The said sealing and suspension members can be constructed in many different ways, such as the one shown in FIG. 4. Here the solid porous body **1** does not have the armour **2** shown in the preceding figures and the flange **23** is cast into a peripheral groove in the body **1**. The terminal sealing members **25**, **26** also are cast or fastened into shallow hollows in the body **1**. The valve apertures **11**, **12** do not have the sharp ridges **13**, **14** of FIG. 1 but are instead provided with expanded portions **27** and **28** flaring away from the corresponding valve aperture. The sealing members **25**, **26** of lead or some other plastic material are preferably slightly conical so as to be able to enter the valve apertures. The said expanded portions **27**, **28** may have various wall contours, the essential thing being only that they have around the whole or a part of the circumference of the valve aperture radially extended

portions relative to the outer portion of the valve aperture, so as to form an under-cut valve seat.

When one of the sealing members, such as the member **25**, is pressed into a valve aperture **11**, the material of the member is pressed into the expanded portion **27** and not only seals off the valve aperture but becomes attached in the expanded portion, so that the sealing member **25** is now locked in sealing position. If it is assumed that the gas flow in FIG. 4 occurs downwardly and that the explosion wave comes from below, i.e. up-stream, then the body **1** will be driven upwards and the sealing member **25** into its sealing locked position against the action of the pressure from the gas stream coming from above, so that the latter will be shut off.

Further variations of the detailed construction are possible within the scope of the invention. It is not necessary, although preferable, for the flange to form a gas-tight seal on the outside of the body **1**, so that there is no free passage for the gas on this side. The sealing members for sealing off the valve apertures may be of many different materials, which are able to withstand the pressure and temperature occurring in the absorption of an explosion without losing their sealing property against the valve apertures and the gas sealing properties need only be sufficient for the required blocking function.

What is claimed is:

1. A flash arrester for a gas conduit comprising a casing defining therein a chamber having side walls in which is defined an annular recess and having opposed end faces in each of which is defined an opening to a port extending through said casing, through which port said chamber communicates with the conduit, a porous body disposed in said chamber, said body being slidable endwise in said chamber, a yieldable flange attached to said porous body and engaged in said annular recess to retain said porous body in said chamber spaced at a distance from both of said end walls, said flange being yieldable at explosive endwise pressures to permit said body to slide in said chamber, and closure members attached to said porous body opposite the said openings in the opposed end faces, said closure members adapted on endwise movement to close said openings.

2. A flash arrester according to claim 1 further comprising sealing means surrounding each of said ports adapted for sealing engagement with the closure member opposite the opening to said port.

3. A flash arrester according to claim 2 wherein each of said ports has locking means therein adjacent its said opening and the opposed closure member is of a deformable material that will enter through said opening and sealingly engage with said locking means.

4. A flash arrester according to claim 2 wherein said sealing means comprises an annular projection on each end face around the opening therein and said closure member is of a material which will conform sealingly with said projection.

5. A flash arrester according to claim 3 wherein said locking means comprises a groove in said port undercutting the periphery of said opening.

6. A flash arrester according to claim 2 wherein the casing comprises two disengageable members connected with one another to form said recess at their interface.

7. A flash arrester according to claim 2 wherein the porous body comprises a cylindrical member of porous material enclosed by a shell of armour material.

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