A valve-venting method increases the durability of flow restrictors within gas venting valves used on large diameter water and sewer pipelines such that transient high pressure conditions that can cause rapid adiabatic heating of the discharging gases are prevented from causing flow erosion and debris wear induced by the high velocities and thermal softening of the valve components. The method utilizes wear resistant orifice inserts that are more conductive than the valve component to better distribute the heat, and dynamic surge control geometry to slow the heat flow and provide progressive water-hammering control during high pressure events.
INTERNATIONAL SEARCH REPORT

International application No. PCT/US2011/047171

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - F16K 24/04 (2013.01) USPC - 137/430

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

USPC - 96/108; 137/202, 411, 423, 430, 433; 141/44, 302; 251/14; 277/549, 644, 910

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

CPC - F16K 24/042, 24/044 (2013.01)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatBase, Google Patent

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>GB 758,283 A (HOLDEN) 03 October 1956 (03.10.1956) entire document</td>
<td>1-8, 10-16, 18-20</td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:
  "A" document defining the general state of the art which is not considered to be of particular relevance
  "E" earlier application or patent but published on or after the international filing date
  "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
  "O" document referring to an oral disclosure, use, exhibition or other means
  "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

24 June 2013

Date of mailing of the international search report

10 JUL 2013

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Form PCT/ISA/210 (second sheet) (July 2009)

Authorized officer: Blaine R. Copenheaver

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774