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Gilbert et al.

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[54] **BALL VALVE FOR LETHAL GAS OR FLUID SERVICE**

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[52] **U.S. Cl.** **251/214**; 277/523; 251/315.14

[58] **Field of Search** 251/214, 264, 251/265, 266, 267, 268, 269, 330, 315.01, 315.11, 315.16, 315.14; 277/511, 520, 522, 523

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,151,837	10/1964	Bentley-Leek	.....	251/214
3,216,697	11/1965	Holmberg	.....	251/214
3,218,024	11/1965	Kroekel	.....	251/58
3,257,095	6/1966	Siver	.....	251/330
3,371,676	3/1968	Mullaney, III	.....	251/214
3,425,663	2/1969	Priese	.....	251/214
3,586,289	6/1971	Priese	.....	251/214

3,787,060	1/1974	Astill et al.	.....	251/214
4,773,442	9/1988	Lephilbert	.....	251/214
5,192,049	3/1993	Ridge	.....	277/523
5,407,176	4/1995	Nevrekar	.....	251/214
5,531,244	7/1996	Siver	.....	251/214

OTHER PUBLICATIONS

McCannaseal® Ball Valves Brochure, Feb. 1997, pp. 1-24.

Primary Examiner—George L. Walton

[57] **ABSTRACT**

An improved ball valve for lethal gas or fluid service is disclosed having a novel triple redundant stem to bonnet seal design. A ceramic seal ring forms the primary stem to bonnet seal. The ceramic seal ring has a first seal surface lapped for sealing engagement with a corresponding lapped surface on the stem and a second seal surface lapped for sealing engagement with a corresponding lapped surface on the bonnet. The ceramic seal ring first seal surface lapped for sealing engagement with a corresponding lapped surface on said stem and the corresponding lapped surface on the stem may be frustoconically or spherically shaped. An elastomeric seal and a compression type seal between the stem and bonnet act as redundant seals. A preloading means to maintain the ceramic seal ring and lapped sealing surfaces on the bonnet and stem in sealing engagement is shown.

33 Claims, 8 Drawing Sheets

