brass, or other copper alloys as a potential material on construction.

[0006] Also, the internals of the valve are made of iron and nickel alloys whether the valve is made of brass or stainless steel

[0007] The present invention is a method for inhibiting the formation of carbonyls in carbon monoxide cylinders.

SUMMARY OF THE INVENTION

[0008] A first aspect of the present invention provides for a method for inhibiting the formation of carbonyl compounds in a closed gas cylinder containing carbon monoxide wherein the gas cylinder is in fluid communication with a valve assembly wherein the valve assembly connects to a threaded opening in the gas cylinder by a threaded assembly comprising coated interior and exterior components of the valve assembly selected from the group consisting of an inlet port, an outlet port, and a lower spindle with an amorphous hydrogenated silicon.

[0009] A second aspect of the present invention provides for a method for inhibiting the formation of carbonyl compounds in a valve assembly wherein the valve assembly is in contact with carbon monoxide comprising coating interior and exterior components of the valve assembly selected from the group consisting of an inlet port, an outlet port, and a lower spindle with an amorphous hydrogenated silicon.

[00010] For purposes of the present invention, the interior and exterior components of the valve assembly namely the inlet port, the outlet port, the diaphragm and the lower spindle are coated with an amorphous hydrogenated silicon to provide an inert barrier. The amorphous hydrogenated silicon compound can be further augmented with functionalized group in order to provide different anti-corrosion

properties for different gas types. The functionalized version is available under the Dursan trademark from SilcoTek. The non-functionalized silicon compound is available from SilcoTek under the Silcolloy trademark.

[00011] For purposes of the present invention, the amorphous hydrogenated silicon, with or without functionalized groups is coated via a chemical vapor deposition process on the surfaces of the valve assembly to be protected.

[00012] Typically, the interior and exterior components of the valve assembly are coated with the amorphous hydrogenated silicon compound before the threaded assembly is inserted into the threaded opening in the gas cylinder.

[00013] In another embodiment of the invention, the interior and exterior components of the valve assembly further comprise a diaphragm, wherein the diaphragm can be coated with the amorphous hydrogenated silicon compound.

[00014] In a third aspect of the invention, there is disclosed a valve assembly comprising a valve body having a fluid passage therethrough having inlet and outlet ports, a valve chamber in fluid communication with the inlet and outlet ports in the valve body, a first valve for opening and closing the fluid passage to control a flow of gas through the fluid passage, a threaded assembly in fluid communication with the fluid passage, a threaded assembly in communication with the outlet port, wherein the valve comprises a valve member comprising a lower spindle, an intermediary spindle and an upper spindle in the form of a threaded rod, the threaded rod in contact with a valve seat and diaphragm upon which the threaded rod engages in the valve-closing position, wherein the valve allows passage of the gas from the inlet port through the fluid passage to the outlet port when the threaded rod is not engaging the valve seat, wherein the valve seat, the inlet port and the outlet port are coated with an amorphous hydrogenated silicon compound.

[00015] The carbonyl compounds that are formed are typically those formed by