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ANTI-BLAST AND ANTI-SUCTION AIR VALVE FOR ATOMIC BOMB SHELTER

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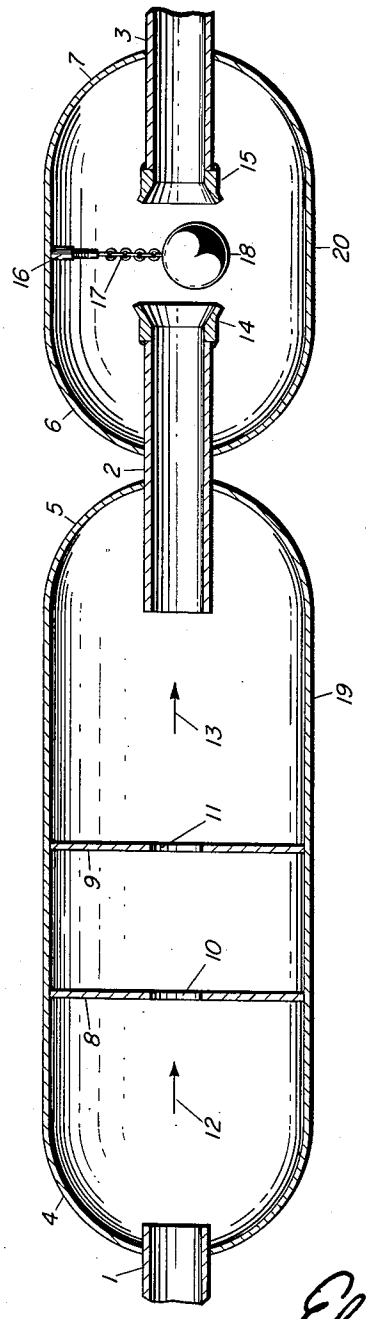

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ANTI-BLAST AND ANTI-SUCTION AIR VALVE FOR ATOMIC BOMB SHELTER

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1 Claim. (Cl. 137—516.25)

This invention generally relates to atomic bomb shelters and more particularly to the anti-blast and anti-suction valve mechanism for the air intake and air exhaust lines of said shelters.

An object of the invention is to provide an improved and safer method of preventing the radiation, heat and overpressure from nuclear explosions from entering the survival chamber of the basic bomb shelter and likewise prevent the ensuing suction following a blast from sucking the air or oxygen from the survival chamber or living area of the basic bomb shelter.

The drawing shows inside elevation a cross section of the air intake or air exhaust valve assembly.

Referring specifically to the drawing, members **1**, **2** and **3** are standard steel pipes. The tank **20** forms a valve chamber and includes standard end sections **6** and **7**. Mounted within tank **20** is a fixed pivot member **16** which as shown is adjustable as to height. Pivotally mounted on member **16** is a non-corrosive steel chain **17** that supports a non-corrosive steel ball **18** which acts as the valve member. Cooperating with said valve member are a pair of valve seats shown at **14** and **15**. Connected to the valve chamber tank **20** by pipe **2** is a blast absorption tank **19** which includes the standard tank ends **4** and **5**. Within tank **19** are mounted a plurality of baffle plates **8** and **9** which include circular holes corresponding in I.D. to that of the standard steel pipe members **1**, **2** and **3**. Further, arrows **12** and **13** indicate the direction of air flow for intake with exhaust flow being in the reverse direction.

The non-corrosive steel ball or equivalent **18** (it could be a flat plate with seats ground accordingly to fit) is supported by a non-corrosive steel chain **17**. This ball **18** is so situated in the valve chamber **20** and so weighted that it will permit the normal flow of air to pass through the chamber **20** without closing. This is accomplished by delicately weighting the ball **18** to remain in an open position at a desired maximum normal air velocity. Whenever over pressure beyond this point of normal velocity develops the accelerated flow of air will cause the ball **18** to seat against the ground seat **15**. This movement is accelerated by the air pressure against the ball **18** and by the creation of a vacuum in front of the ball's movement through the use of wide seats **14** and **15**. As soon as the overpressure drops to normal the valve or ball **18** will swing open to its neutral position. As soon as the underpressure or near vacuum develops following the initial blast waves the ball **18** will swing to its opposite closing position and seat on the ground seat **14**. As soon as the external air pressure returns to normal the valve or ball **18** will again return to its neutral position.

In the event of failure of the ball **18** to open and also for routine cleaning and inspection there will be provided a removable plate (not shown) for freeing or cleaning the valve or ball **18**. Inasmuch as said removable plate is of quite simple construction and may be accomplished in various manners it is not felt that the details are of sufficient import to add to the value of the invention.

Due to the high velocity of the initial shock wave from a nuclear explosion (1400 to 4000 ft. per second) it has been determined that the valve or ball **18** would not have time to activate itself and close in sufficient time to protect the occupants of the basic bomb shelter. Further it has

been determined that this initial shock wave does not push masses of air with its action. Therefore the installation of the anti-blast chamber **19** to the air line just ahead of the valve closure chamber **20** will accomplish this purpose by diffusing the initial blast to force such an extent that the secondary wave from the blast travelling at approximately the speed of sound will activate and close the valve ball **18** in sufficient time. Baffle plates **8** and **9** in the chamber **19** are used to confuse and diffuse the initial high velocity over pressure.

It is contemplated that the entire assembly shown in the drawing will be installed in the entranceway to the basic bomb shelter in an absolute plumb position in order that the valve or ball **18** will be suspended in a truly neutral position. It may however prove desirable to separate the two chambers **19** and **20**, placing the valve closure chamber **20** in some accessible location and burying the initial anti-blast chamber **19** at some point in the air line ahead of the valve closure chamber **20**.

Manufacture of the complete assembly will be accomplished generally through the use of standard pressure tank ends of the proper rating and assembly will be accomplished by the means of continuous certified welds. Valve seats **14** and **15** will be machined after welding the standard steel pipe sections in place and finally grinding and lapping these seats to required tolerances. Balance of assembly will be rather obvious and simple to those skilled in the trade.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

This application is a continuation-in-part of applications Serial No. 143,716, filed October 9, 1961, and Serial No. 155,912, filed November 30, 1961, both abandoned.

Having thus completely and fully described the invention, what is now claimed as new is as follows:

In combination an anti-blast and anti-suction air valve and blast absorption chamber for an air line leading to a bomb shelter comprising; a first pressure tank, pipe means extending into said tank from opposite ends thereof, the ends of said pipe means in said tank including valve seats, means forming a fixed pivot in said tank, a steel chain having one end fixed to said pivot means, a steel valve ball fixed to the other end of said chain and extending therefrom to a position between said seats by the force of gravity, means forming an absorption chamber having one end connected to one of said pipe means comprising; a heavy duty pressure tank having a pipe connected to said opposite end, and a plurality of apertured baffle plates mounted in said pressure tank whereby said valve swings in an arc of a pendulum to a closing position on one or the other of said seats during the overpressure or negative pressure phase of an explosion and whereby said baffle plates are arranged to break up or diffuse the initial shock wave resulting from said explosion.

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