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DUST STORM RESISTANCE TESTING CHAMBER

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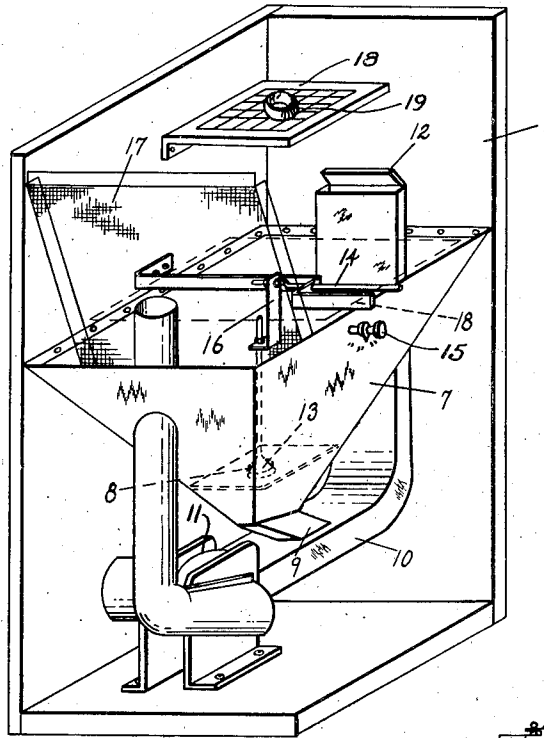


FIG. 2

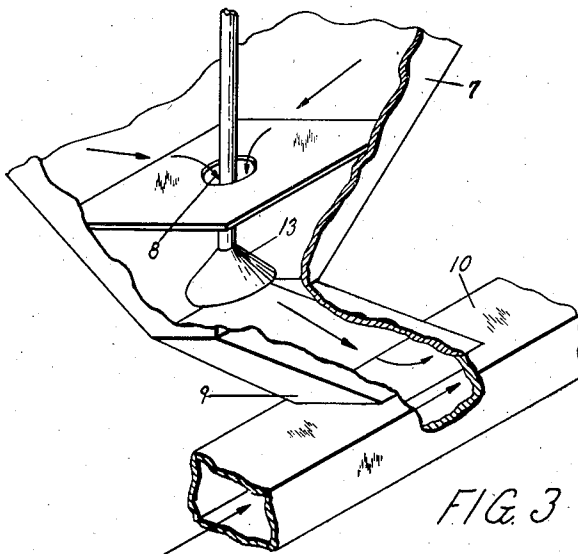


FIG. 3

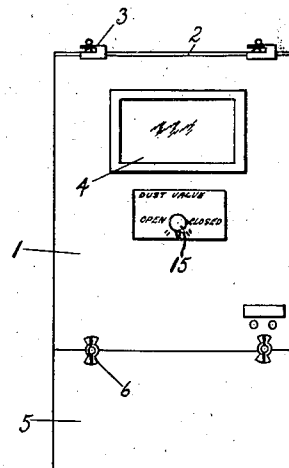


FIG. 1

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DUST STORM RESISTANCE TESTING
CHAMBER

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Government of the United States of America,
as represented by the Secretary of War

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

The invention to be hereinafter disclosed relates to dust storm resistance testing chambers.

Prior to the present invention there has been no means known to applicant whereby desert dust storm conditions could be simulated with satisfactory accuracy for test purposes.

It has been found that there is difficulty in preventing leakage of fine dust to outside of any given chamber. Also great difficulty has been found, as a result of getting dust into the pump, fan, blower or other dust circulating means, resulting in quickly cutting bearings and other moving parts. Other difficulties have been found in the feed of dust into the circulating system.

The present invention either eliminates or greatly minimizes the above and other objections.

In order to more clearly disclose the construction, operation and use of the invention, reference should be had to the accompanying drawings forming part of the present application.

Throughout the several figures of the drawings like reference characters designate the same parts in the different views.

In the drawings—

Fig. 1 is a front view of the chamber;

Fig. 2 is a perspective view of the interior, from the left front corner, the front, top and near end walls being completely removed for clearness; and

Fig. 3 is a fragmentary view, broken away, showing the valve and connections.

The chamber herein illustrated for purposes of this patent application is a very small one, though it embodies all the features of the invention. The same chamber may be built in any desired size, of course. Likewise, the respective proportions or dimensions may be modified, within pretty wide range, to suit the particular circumstances and requirements of the respective tests as well, to a certain extent, as the individual users desire. Merely as a matter of illustration of proportions, the specimen chamber here shown has, approximately, the following dimensions: Height two feet, width one and one-half feet and thickness one foot.

The above chamber 1 is provided with a removable top 2 having beveled, chamfered, or rabbeted edges cooperating with complementary chamber wall surfaces to provide thoroughly tight joints between the top and walls or body so that no dust may escape. The top is forced to dust proof seating position and so held by any one of a number of cam acting catches 3. Many such have a pivoted turn-button type member cooperating with a hook member presenting a cam surface to

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the turn-button. These are commonly and widely used for door and similar fasteners. In the illustrated chamber the upper section of the front wall is permanently secured to the adjacent walls and is provided with an observation window 4 through which the storm within may be watched and its effects studied for regulation. The lower part of the front comprises a removable panel 5 secured in place by turn-buttons or similar catches 6. This panel gives access to the lower part of the chamber where the operating mechanism is located. Likewise, this lower section is entirely below the dust storm portion and, therefore, does not require to be dust proof. Consequently, the joint or closure between the lower part of the chamber and panel 5 does not require to be so tight, nor do the turn-button catches require to be so tight.

Within the lower part of chamber 1 is disposed a hopper 7, extending completely across the chamber from front to back and from end to end, completely dividing the upper part of the chamber from the lower. The bottom of the hopper is provided with an outlet opening 8 through which accumulated dust will gravitate into a chute or inclined tubular passage 9 which communicates with the circulation conduit 10. The circulation conduit 10 includes a blower 11 of any usual and well known type connected to receive screened or dust free air through an upper open end of the conduit 10 and force it through the branch into which the dust is delivered and finally deliver it at an angle inwardly and upwardly across the upper part of the chamber toward the top and center. For this purpose, the upper or delivery end of the conduit 10 is widened fan-wise and provided with a deflecting blade or vane 12. The blower may be driven or operated in any suitable and well known manner.

The main purpose of the valve 13 in the hopper bottom is to cut off the flow into the conduit 10 at any time when the system is inoperative. If there were no control of the dust flow from the hopper into the circulation conduit, as soon as the blower stopped, the passage 8 and the adjacent sections of 10 would solidly fill and present a complete dam, obstruction or block and the whole system would become inoperative. By closing valve 13 as soon as the blower is stopped or a little sooner, any such block is prevented. For operating the valve a rod 14 extends across the hopper from front to back. It is provided with a suitable knob 15 having a pointer cooperating with suitable designations on the upper front wall just below the window 4. A well known type of adjustable link rod connection 16 from 14 to 13 actuates the valve on operation of the knob 15.

Opposite deflector 12 is a fine screen 17 which

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extends completely across the chamber from front to back. Its upper end is secured to the upper end of that chamber wall while its lower end considerably overlaps the intake of that branch of conduit 10 leading to blower 11 and extends down into the upper part of hopper 7. It is inclined away from the adjacent wall of the chamber. This screen is of sufficiently fine mesh to constitute and act as a filter so that the dust in the dust laden air entering the chamber through 10 will be completely screen out and the filtered air passing through the screen will pass to the blower.

Above the hopper is removably disposed a grid or other suitable open work support indicated in dotted lines at 18 on which may be placed any article 19 to be tested. This grid, in the preferred arrangement should, of course, present the least possible obstruction to the flow of air either dust laden or dust free.

Briefly, the operation of the invention is substantially as follows. After the valve 13 has been closed by turning knob 15 to the closed position, the hopper is supplied with dust, the grid 18 is put in place, the article to be tested is put on the grid, the blower is started and the valve 13 is opened. As the dust laden air circulates in the chamber the article is tested in the dust "storm," the air is filtered and recirculated, continually picking up dust from the passage 9.

It is believed that the construction, operation and use of the invention will be clear from the preceding detailed description.

Many changes may be made in the construction arrangement and disposition of the various parts of the invention within the scope of the appended claims without departing from the field of the invention and it is meant to include all such within this application wherein only one preferred form of the invention has been shown purely by way of illustration and with no thought or intention of, in any degree, limiting the invention thereby.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. In combination in a dust storm resistance testing apparatus, a chamber, a hopper therein extending completely across the interior of said chamber and dividing it into upper and lower parts, a conduit below said hopper communicating therewith and delivering thereabove, a blower delivering to said conduit, an air supply delivering to said blower from above said hopper and means controlling communication between said conduit and said hopper.

2. In combination in a dust storm resistance testing apparatus, a chamber, a hopper therein extending completely across the interior of said chamber and dividing it into upper and lower parts, a conduit below said hopper communicating therewith and delivering thereabove, a deflector associated with said conduit and directing delivery at an angle to the outlet thereof, a blower delivering to said conduit, an air supply delivering to said blower from above said hopper and means controlling communication between said conduit and said hopper.

3. In combination in a dust storm resistance testing apparatus, a chamber, a hopper therein extending completely across the interior of said chamber and dividing it into upper and lower parts, a conduit below said hopper communicating therewith and delivering thereabove, a blower delivering to said conduit, means directing delivery from said hopper into said communicating

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conduit at an angle to the flow through the conduit and in the direction of flow, an air supply delivering to said blower from above said hopper and means controlling communication between said conduit and said hopper.

4. In combination in a dust storm resistance testing apparatus, a chamber, a hopper therein extending completely across the interior of said chamber and dividing it into upper and lower parts, a conduit below said hopper communicating therewith and delivering thereabove, a blower delivering to said conduit, an air supply delivering to said blower from above said hopper, a filtering screen in said chamber above said hopper and in the path of air supply delivering to said blower and means controlling communication between said conduit and said hopper.

5. In combination in a dust storm resistance testing apparatus, a chamber, a hopper therein extending completely across the interior of said chamber and dividing it into upper and lower parts, an object support carried by, supported on and extending across the upper open end of said hopper, a conduit below said hopper communicating therewith and delivering thereinto from above, a blower delivering from the upper part into and through said conduit and back into said upper part, a filtering screen in the upper part of said chamber intercepting and screening air passing to said conduit, a deflector carried by an upper end of said conduit in the delivery flow and directing the flow across the open end of the hopper, a valve controlling flow from said hopper to said conduit and means for operating said valve from outside of said chamber.

6. In combination in a dust storm resistance testing apparatus, a chamber, a hopper therein extending completely across the interior of said chamber and dividing it into upper and lower parts, an object support carried by, supported on and extending across the upper open end of said hopper, a conduit below said hopper communicating therewith and delivering thereinto from above, a blower delivering from the upper part into and through said conduit and back into said upper part, a filtering screen in the upper part of said chamber intercepting and screening air passing to said conduit, a deflector carried by an upper end of said conduit in the delivery flow and directing the flow across the open end of the hopper, a reciprocable valve controlling flow of dust from said hopper into said conduit, a revoluble crank shaft mounted in said chamber, connections between said crank shaft and valve for operating said valve and means for operating said valve from a point external to said chamber.

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