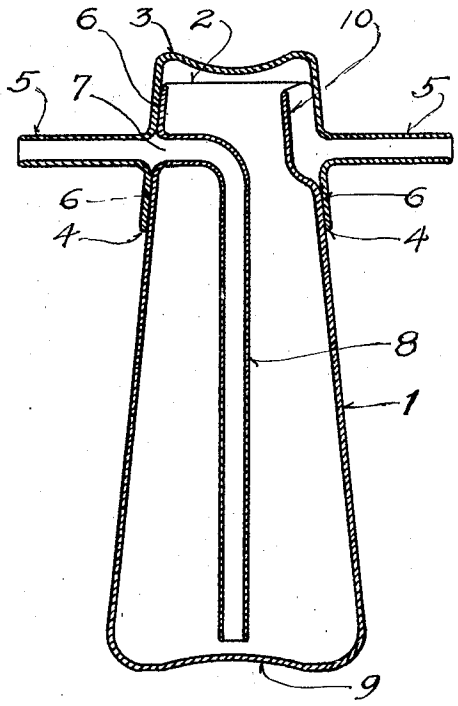
Sept. 13, 1932. W. D. TURNER 1,877,151

ABSORPTION BULB FOR COMBUSTION ANALYSIS

Filed May 15, 1930



INVENTOR
William D. Turner
BY
Jos. N. Nelson
ATTORNEY

Patented Sept. 13, 1932 1,877,151

UNITED STATES PATENT OFFICE

WILLIAM D. TURNER, OF NEW YORK, N. Y.

ABSORPTION BULB FOR COMBUSTION ANALYSIS

Application filed May 15, 1930. Serial No. 452,800.

This invention relates to absorption bulbs, especially those for use with solid absorbents, such as Ascarite, etc. in combustion analysis. Many types of absorption bulbs have been proposed in the progress of the art, each incorporating some advantages over its predecessors. In most instances, however, each new advantage has been gained at the expense of some other favorable feature, such as simplicity of construction.

An object of the present invention is to present a construction having a maximum of advantageous features, without a corresponding complication in construction or other loss of desirable characteristics. A further object is a bulb that can be manufactured at a relatively low cost. These and other objects of the improvement constituting my present invention are, in brief, accomplished by using an external instead of an internal stopper, as heretofore, and constructing the bulb so as to allow a simultaneous cut-off of both inlet and outlet openings by one turn of the stopper or of the main body of the bulb.

The figure of the accompanying drawing shows the bulb in vertical section. The bulb consists of but two separable parts, a main body 1, being in the form of the frustum of a right circular cone, having the upper base 2 completely open, and a glass stopper 3, also in the form of a frustum of a right circular cone, having its lower base 4 completely open, and arms 5 attached at the sides 180 degrees apart. The glass on the outside of the upper portion 6 of the cone frustum comprising the main body 1 is ground and has a small inlet hole 7 in the ground surface to which a glass tube 8, open at its bottom, is attached, leading to the bottom of the bulb, along the axis of the cone frustum, but not touching the lower base 9 of the main body of the bulb. 180 degrees from said inlet hole 7, an indentation 10 of the said ground glass surface, comprising perhaps 1/8 of the circumference of the upper base 2, provides a break in the seal of the external stopper 3 whereby gases can pass over the edge to the outlet arm 5. The seal at the bottom of the ground surface 6 extends all around the cone frustum, however, making it air-tight at the points, where the lower base 4 of the stopper 3 joins the outside of the main body 1.

The stopper 3 has the glass ground all around its inside walls. It is in shape like an inverted cup and is made to fit snugly over the main body 1 of the bulb by giving it the same rate of taper as the body. The inlet and outlet arms 5 being attached 180 degrees apart to the sides of the stopper 3, are so placed as to line up with the inlet hole 7 and the outlet indentation 10 in the ground surface of the main body 1 of the bulb. The diametrically opposite spacing of the openings in the body and the hollow arms of the stopper is not essential; but such a spacing permits either one of the arms to be brought into alignment with the inlet opening 7 of the body and insures alignment of the other arm with the indentation 10.

The main body 1 of the bulb may be readily filled with the absorbent material, such as Ascarite, etc. since the open upper end 2 is practically free from any obstruction. The outlet, being in the form of an indentation 10 in the upper edge of said body, permits the bulb to be filled to the very top with the absorbent material. To use the bulb, after it has been packed, the glass stopper has been turned 90° to seal the bulb and a weight has been taken, the arms 5 are connected by rubber tubing or other suitable means, so that the incoming gas, containing the material to be absorbed will be fed into one arm, and the gases from which the material has been absorbed will be discharged by the other arm. Thus by a single turn of the main body 1 of the bulb, so that the arm of the stopper 3 having the laden gases lines up with the inlet opening 7, the absorption is started, without disturbing the connections. The gases pass through the inlet opening 7, down the tube 8 to the bottom of the bulb, up through the absorbent materials on all sides of the central tube 8 to the very top of said body 1 and finally out through the indentation 10 and outlet arm 5 to leave the system. After a definite period of absorption in accordance with the requirements of the particular material being absorbed, the main body 1 of the bulb is again turned

ninety degrees, thus sealing the bulb; the arms 5 of the stopper are disconnected and a final weight of the bulb is taken.

It is evident that a single turn of the stopper or main body will shut off both inlet and outlet simultaneously. This prevents the diffustion of air into the absorber during the operation of connecting or disconnecting. Several other advantages make themselves evident, as are listed below.

1. Minimal outside surface—easy to wipe to constant weight.

2. Minimal parts—one body, one stopper, having only one ground joint.

3. Minimal surface contour—low breakage.

4. Minimal waste space—larger capacity of bulb completely utilized.

5. Stable standing, making weighing on a balance easy.

6. Light weight.

7. Plain internal design—internal surface accessible to wiping—also low breakage due to internal simplicity.

8. Ground joint external—not contaminated in charging.

9. Simple construction—low cost.

It should also be evident that all specific dimensions given may vary with the particular needs of the bulb, important features of the invention comprising the use of an external stopper or equivalent sealing means and simultaneous cut-off of the openings in the body. While the invention is set forth in its application to an absorption bulb, the invention has application to other types or pieces of apparatus and is therefore to be given a scope commensurate with the appended claims.

I claim:

1. An absorption bulb for dry absorbents comprising a body, having openings in its upper portion diametrically opposite each other, one of said openings having a tube extending therefrom axially of said body and into proximity with the lower base of said body, the other of said openings comprising an indentation in the upper edge portion of the wall of said body, and a stopper of inverted cup shape, engaging the external surface of the upper portion of said body having inlet and outlet arms attached diametrically opposite for alignment with said openings in said body, said stopper having a ground glass engagement with the external surface of the upper portion of said body to provide a gas-tight seal for the bulb.

2. An absorption bulb for dry absorbents comprising a body, having openings in its upper portion, a tube extending from one of said openings into said body and into proximity with the lower base of said body, and a stopper engaging the external surface of the upper portion of said body having inlet and outlet arms attached for alignment with the said openings in said body, said stopper having a ground glass engagement with the external upper portion of said body to provide a gas-tight seal for the bulb.

3. An absorption bulb comprising a body, having openings in its upper portion, a tube extending from said inlet into said body and into proximity with the lower base of said body, a stopper engaging the external surface of the upper portion of said body, having an inlet and outlet provided in alignment with said openings of said body to permit simultaneous cut-off of the openings in said body, said stopper having a ground glass engagement with the external upper portion of said body to provide a gas-tight seal for the bulb.

4. An absorption bulb comprising a body with an open upper end having an opening in its upper portion and an indentation in the edge of the upper end, and an inverted cup shaped stopper fitting over said upper end and having openings therein spaced for alignment with said opening and said indentation.

5. A piece of apparatus comprising a body with spaced openings therein, and movable means engaging the exterior side of said body for sealing said openings, said means having openings therein spaced for simultaneous alignment with said openings in the body.

In testimony whereof, I affix my signature.

WILLIAM D. TURNER.