

No. 612,516.

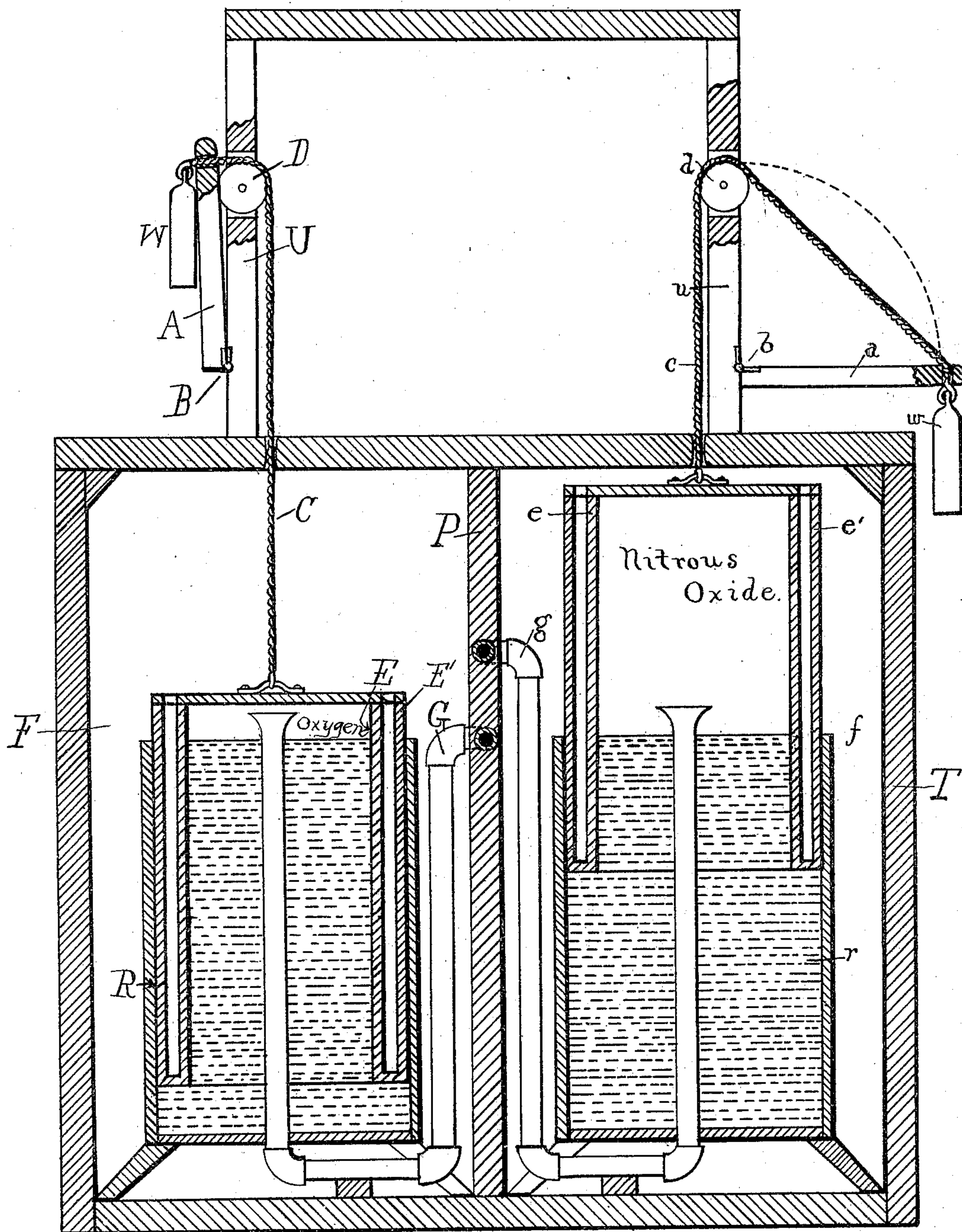
Patented Oct. 18, 1898.

R. H. CULLUM.

GASOMETER.

(Application filed Oct. 23, 1897.)

(No Model.)



Witnesses:  
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# UNITED STATES PATENT OFFICE.

RICHARD HENRY CULLUM, OF ST. PAUL, MINNESOTA.

## GASOMETER.

SPECIFICATION forming part of Letters Patent No. 612,516, dated October 18, 1898.

Application filed October 23, 1897. Serial No. 656,174. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD HENRY CULLUM, a citizen of the United States, residing at St. Paul, Ramsey county, Minnesota, have  
5 invented certain new and useful Improvements in Gasometers, of which the following is a specification sufficiently full, clear, and exact to enable those skilled in the art to which the invention pertains to make and use the  
10 same.

In the administration of gas by dentists and the like it is common to employ two flexible bags, one containing the nitrous oxid and the other the oxygen, from which bags pipes  
15 lead to the mouthpiece or inhaler proper, where the mixing of the gases occurs; but the objection has been noted that these bags when at first distended and possibly slightly stretched supply their gases under pressure  
20 and at too great a force, whereby the patient is partially strangled and always frightened and rendered nervous, whereas afterward when the bags become partially emptied they do not supply the gases with sufficient force  
25 or speed and weights have to be placed thereon at intervals which can only be guessed at and are as unreliable as the skill of the attendants. To overcome these objections, various other devices have been constructed, all  
30 with their particular disadvantages.

The object of the present invention is to produce a device which will supply a gas (or in its double form two gases) at a constant force or pressure to the mouthpiece, where it can  
35 be valved or regulated in its supply to the patient, so that the admission of the anesthetic can easily be regulated to correspond with atmospheric pressure. By this means the patient is almost, if not quite, unconscious  
40 of the moment when the anesthetic begins to flow, and fright and nervousness are effectually avoided. This object I attain by the mechanism described below and illustrated in the accompanying drawing, which shows  
45 in section two tanks, one of which is for the oxygen and illustrates its cylinder as lowered and the other of which is in the present instance for the nitrous oxid and shows its cylinder raised. However, it will be clear  
50 that a single tank could be employed for containing but one gas or anesthetic, and if the latter was actually composed of two gases

they could be mixed and supplied to the single cylinder in any suitable manner.

Referring to the accompanying drawing, 55  
the letter T designates a tank (here of sufficient size to contain two cylinders, although it need contain but one when a single gas is to be administered) of any suitable material and shape. Within this tank is located a  
60 reservoir R, containing water and open at its top at a point some distance below the closed top of the tank, and fitting closely within the reservoir R is a cylinder E, of inverted-cup shape, containing the oxygen. 65

G is a pipe leading from within the cylinder possibly down through the reservoir and to the exterior of the tank, where it is suitably connected with the mouthpiece. (Not shown.) On the tank or upon any suitable  
70 support is mounted an upright U, carrying a pulley D about over the center of the cylinder, and C is a cord connected with the cylinder E, leading thence over said pulley and carrying a weight or counterbalance W at its  
75 other end.

A is an arm or lever hinged at B, possibly to the upright U, near the top of the tank, and of sufficient length so that its outer end, which is attached to the cord just above the  
80 weight, will come just under the pulley D when the cylinder is lowered, as seen at the left in the drawing.

If instead of two tanks there is one which is double, as here illustrated, there is preferably an upright partition P therein, dividing  
85 it into compartments, each containing a cylinder, as above described. In the illustration herewith the right-hand compartment contains a cylinder for the nitrous oxid, and the same letters of reference are employed, except that capitals are used at the left and  
90 small letters at the right. This cylinder also has its pipe g leading to the mouthpiece. (Not shown.) The parts being assembled and  
95 the two cylinders filled with their proper gases and raised, so that the arms A a are horizontal, the weights W w at this time almost or fully counterbalance the weights of their  
100 respective cylinders. As gas is allowed to escape through pipes G g and the cylinders settle into the water in their reservoirs R r the cords draw upon the weights and the latter are raised; but the use of the arms A a



causes these weights to rise through arcs of circles, of which the pivots B b are the centers, and the weights are thus more and more sustained by said arms as they approach a vertical position, until finally the cylinders have become exhausted and the parts stand as seen at the left in the drawing. Meanwhile the cylinders have settled more and more into the water of their reservoirs and gradually lost weight by their increasing displacement of water. If the parts are properly proportioned, this loss of weight of the cylinders should equal the loss of weight of the counterbalances as sustained by the arms, and the result will be an equal and steady supply of the gases to the mouthpiece. This effects the advantages sought to be attained, as above set forth. It is obvious that a single tank, reservoir, and cylinder containing a proper anesthetic could be employed without departing from the spirit of my invention so long as the arrangement of cord, pulley, arm, and weight was used in connection therewith. The size, shape, and exact proportion of parts are immaterial, with these exceptions.

In the practical use of my invention it will be found that the cylinders are of such size that they sink ordinarily to too great a depth into the water, and hence I prefer to make each of them double or with double walls closed at the lower end and open at the top.

E is the inner wall, and E' the outer, thus forming an air-space F between them, which causes greater displacement and buoyancy without increasing the weight of the cylinder. If the latter is thereby made too light for the weight W, as much shot or other ballast, such as water, can be poured into the

air-space and allowed to stand therein as will equalize matters, all as will be clear to the user.

What is claimed as new is—

1. In a gasometer, the combination with an open-topped reservoir containing water, and a pipe leading from above its water-line to its exterior; of an inverted-cup-shaped gas-containing cylinder fitting loosely within said reservoir, a cord leading from the cylinder over a pulley to a counterbalancing-weight, the latter being lowered when the cylinder is raised, and an arm pivoted at a point near the cord and connected with it just above the weight and of such length that it will reach from its pivot to the pulley when upright, as and for the purpose set forth.

2. In a gasometer, the combination with an open-topped reservoir containing a liquid, and a pipe leading from above the surface thereof to the exterior of the reservoir; of an inverted-cup-shaped gas-containing cylinder within the reservoir and comprising double walls closed at their bottom and open to the air at their top, a weight, a pulley, a cord leading from the cylinder over the pulley to the weight, and an arm hinged at one end near the cord and connected at its other end thereto just above the weight, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

RICHARD HENRY CULLUM.

Witnesses:

L. FEESER, Jr.

GEO. E. SCALES.