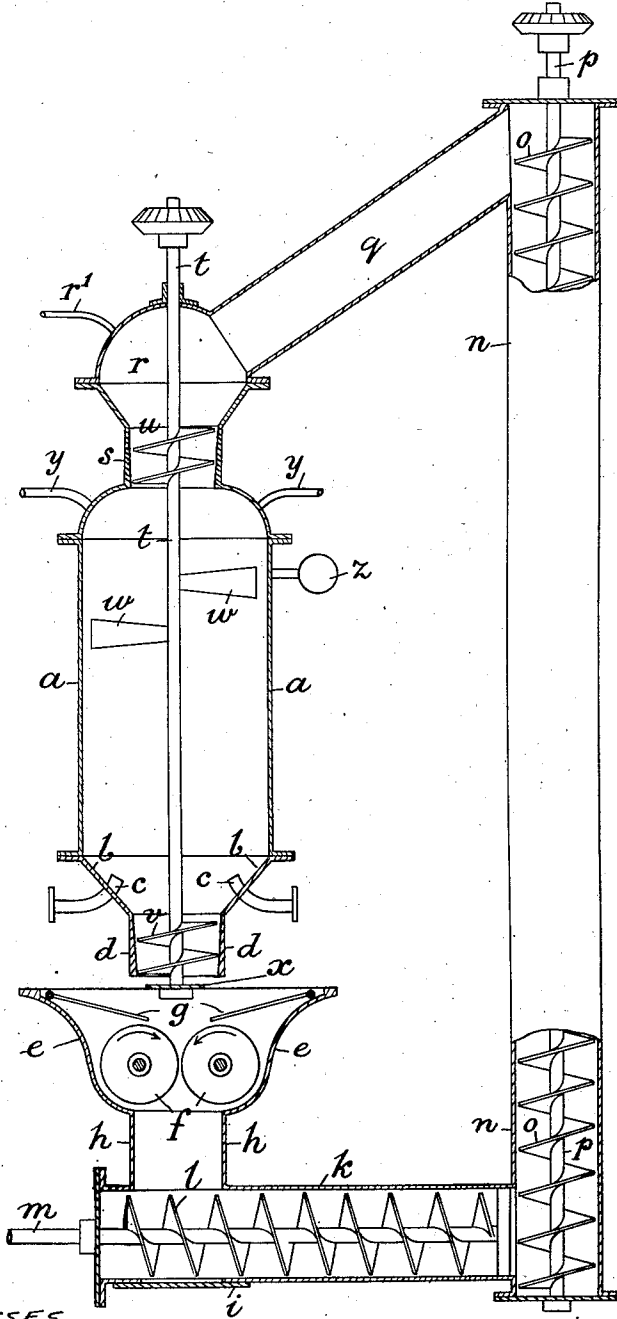


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 APPARATUS FOR MAKING OXYGEN.
 APPLICATION FILED JULY 20, 1909.

945,048.

Patented Jan. 4, 1910.



WITNESSES

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APPARATUS FOR MAKING OXYGEN.

945,048.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES RIDLEY, a subject of the King of Great Britain, residing at London, England, have invented new and useful Improvements in Apparatus for Making Oxygen, of which the following is a specification.

This invention relates to improvements in apparatus for extracting or obtaining gases from solids, by cyclic operations in which the solid material is heated in one part of the operation and is recharged in another part.

Oxygen may be extracted from lead oxid or from permanganate of soda, from the earthy metal oxids and the like, or gas may be extracted from any substance capable of yielding gas under the influence of a blast of steam or hot air at suitable temperatures and pressures.

According to my invention the material is fed into a chamber heated to a temperature suitable for such material to yield its gases upon coming into contact with a blast of steam, it is then conducted into and from the said chamber by means of suitable channels, tubes or ducts by means of Archimedean screws and the like.

To prevent loss of gases by leakage from the inlet or the outlet, the feed is so arranged that there is always a quantity of the gas producing material left on the inlet and outlet ducts or valves. I extract or recover the oxygen or other gases from the chamber by means of an exhaust fan or pump.

After the material is conducted from the chamber by the Archimedean screw or otherwise, it passes into the air, or into a chamber provided to receive it, and absorbs oxygen again, and is then fed back into the chamber by any suitable mechanical means, so that the absorption of the gas and its delivery are both simultaneous and continuous. And in order that my invention may be better understood I will now describe a preferred embodiment thereof with the aid of the accompanying diagrammatic drawing which depicts an apparatus constructed according to my present invention for the continuous production and delivery of oxygen from permanganate of soda or the like.

The gas producing chamber or retort *a* may be suitably mounted in brick-work or may be otherwise supported and may be provided with suitable means for heating the same, so that the material therein may be

heated to the temperature suitable for it to yield the gases upon contact with a blast of steam. The retort is provided with a conical or funnel shaped bottom *b* which is pierced for the reception of a convenient number of inlet pipes *c*. These inlet pipes are so formed and disposed that they are capable of forcing jets of steam into the retort. The pipe conducting to these inlet pipes may be provided with suitable regulating, reducing or other valves.

The lower portion of the retort bottom *b* is furnished with an outlet duct *d* through which the treated material falls (or is forced as hereinafter demonstrated) into the receiving chamber *e* beneath.

The receiving chamber is preferably constructed with a wide open mouth, such mouth permitting the inspection of the material as it emerges from the retort, and also serves for feeding fresh material into the apparatus. The mouth of the receiving chamber being open to the atmosphere, the material as it falls therein from the retort is thus brought into direct contact with the atmosphere from whence it absorbs oxygen.

The interior of the receiving chamber is furnished with suitable rolls *f* rotating in the direction shown by the arrows. The interior of the receiving chamber is also furnished with fixed or pivoted guide plates *g* for guiding the material to the operative surfaces of the rolls. The receiving chamber is provided with an outlet duct *h* which duct may be furnished at its lower extremity with a door *i* for discharging waste or spent material as required. The said outlet duct *h* communicates with a channel or duct *k* provided internally with an Archimedean screw *l* mounted upon a suitably journaled shaft *m*. The said duct communicates with an elevating duct *n* provided with an elevating Archimedean screw *o* mounted upon a suitably journaled shaft *p*. The elevating duct *n* communicates with a gravity duct *q* which opens into the dome *r* attached to the retort *a* by the inlet duct *s*. The lower portion of the retort dome may be conical or funnel shaped.

The retort is furnished with a central shaft *t* which shaft may be axially journaled therein, the upper extremity thereof protruding through the upper portion of the dome *r*. The shaft *t* is provided with a feed Archimedean screw *u* disposed within the inlet duct *s* and also with a similar screw *v*

within the outlet duct *d*. The shaft *t* may also be provided with a convenient number of agitating or mixing blades *w*. The lower extremity of the shaft *t* may be supported
 5 and journaled upon a bearing beam *x* fixed upon and across the mouth of the receiving chamber *e*, or the shaft may be journaled in or upon a bridge support fixed within the outlet duct *d*. A suitable number of gas discharge pipes *y* are provided upon the upper
 10 portion of the retort *a*. I also provide the retort dome *r* with an air discharge pipe *r*¹ for extracting the air from the material before it enters or reenters the retort. The
 15 ducts *d* and *s* are provided with slightly tapering walls so that the material passing therethrough will be slightly packed therein, whereby leakage of gas from the retort *a* is prevented. The retort may also be provided
 20 with a suitable combined vacuum and pressure gage *z* in order that the required pressure within the retort may be maintained, the pressure being preferably slightly in excess of that of the atmosphere.

25 The Archimedean screw shafts are rotated through the medium of a common shaft or may be independently driven so that their speed may respectively be regulated. And the screws may be of suitable pitch for performing their respective duties.

The cycle of operations is as follows:—The gas producing material is fed in through the receiving chamber *e*, passes between the rolls
 35 *f* down through the outlet duct *h* into the traversing duct *k*, thence upwardly through the elevating duct *n*, falling through the gravity duct *g* into the retort dome *r*, through the inlet duct *s* into the retort *a* in which it is subjected to the treatment for extracting the
 40 gas. After treatment the material passes out of the retort through the outlet duct *d* into the receiving chamber *e* where it becomes recharged with oxygen, thence again through the rolls and through the various ducts returning to the retort for re-treatment, the
 45 cycle being continuous, fresh material being added and spent material being withdrawn without interfering with the continuous recovery of gases.

50 I claim.

1. An apparatus of the class described, comprising an open mouthed receiving chamber, a retort located above the same,
 55 means for feeding the material from the receiving chamber to the top of the retort, means for sealing both ends of the retort by

an accumulation of the material, means for introducing steam into the retort and withdrawing the gases therefrom, the material as it leaves the retort dropping into the
 60 receiving chamber.

2. An apparatus of the class described comprising an open mouthed receiving chamber, a retort located above the same and having an outlet port therein through which
 65 the material drops into the receiving chamber, said receiving chamber having an opening in its bottom through which the material may be removed, pipes connecting the bottom of said receiving chamber with the
 70 top of the retort, conveying means in said pipes for conveying the material, means for sealing the inlet and outlet ends of the retort by the accumulation of the material, agitating means in said retort, means for
 75 introducing steam into the retort, and means for withdrawing the gases therefrom.

3. An apparatus of the class described, comprising an open mouthed receiving chamber, rollers therein through which the material is passed in the presence of atmospheric
 80 air, a retort located above the receiving chamber and having its open end situated so as to deliver the material passing therethrough into the receiving chamber, a receiving dome at the upper end of said retort, tubes connecting said dome with the
 85 bottom of the receiving chamber, conveying means for conveying the material through the tubes into said dome, said retort having its inlet end communicating with said dome, a shaft passing through the dome and retort and having a screw conveyer for feeding the material from the dome into the retort and causing said material to seal the top of the
 90 retort, a second screw conveyer on said shaft at the outlet end of the retort for discharging the material from the retort, said screw conveyer also causing the material to seal the retort, means for introducing steam into
 95 said retort and withdrawing the gas therefrom, agitating means on the shaft within the retort, and means for withdrawing the air from the dome.

In testimony whereof I have signed my
 105 name to this specification in the presence of two subscribing witnesses.

CHARLES RIDLEY.

Witnesses:

CHARLES SEPTIMUS BERTHON,
 WILLIAM HYSLOP.