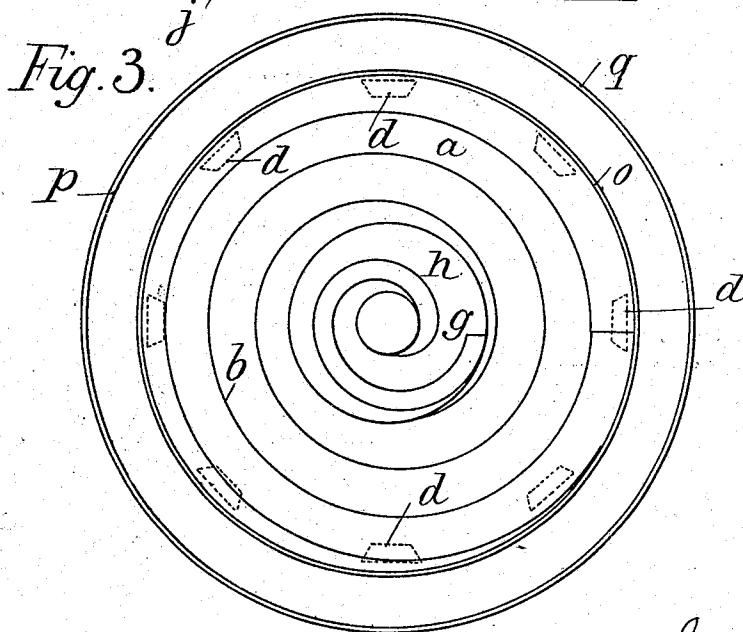
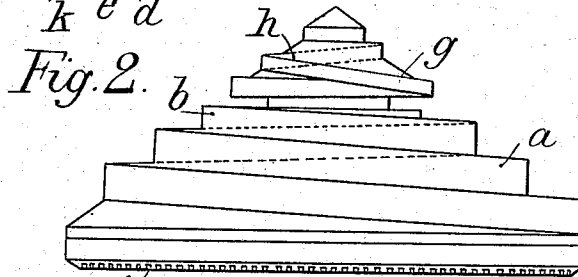
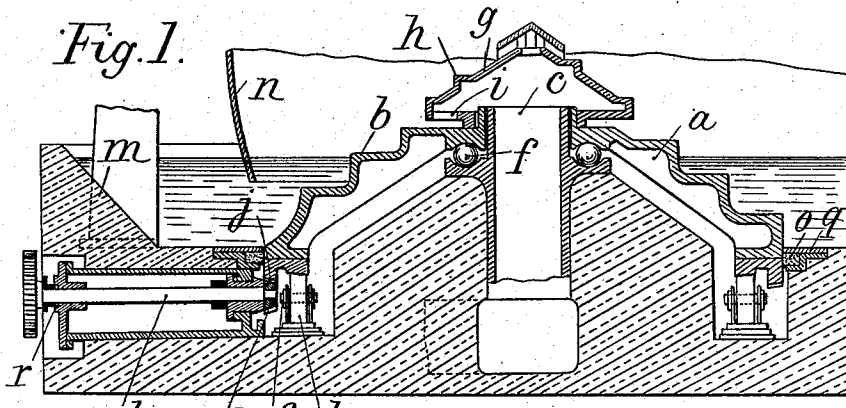


I. A. CHAVANNE.
GAS GENERATOR.

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UNITED STATES PATENT OFFICE.

IRENEÉ ALEXIS CHAVANNE, OF ST. CHAMOND, FRANCE.

GAS-GENERATOR.

No. 930,532.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, IRENEÉ ALEXIS CHAVANNE, of St. Chamond, Loire, France, engineer, have invented a new and useful Improvement in Gas-Generators, which improvement is fully set forth in the following specification.

This invention has for its object a movable grate for gas generators the continuous rotation of which at a suitable speed automatically maintains the zone of combustion at the desired height. For this purpose the movable grate is provided with spiral steps screwing so to speak into the combustible mass, the said steps may be arranged in one or more helices; the general form of the grate is that of a cone turning about its axis which preferably coincides with that of the pipe leading air and steam to the midst of the combustible, and provided at its apex with a blowing cap which may be fixed or rotating and provided with one or more openings. The conical form of the grate as well as that of the inclination of the steps with which it is provided should be determined by taking into consideration the nature and the size of the combustible fuel as well as that of the movement which it is desired to impart to the various portions of the mass. In effect, when the angle of the apex of the cone is too acute, the central portions of the combustible mass pass downward too rapidly, the peripheral portions remaining behind. The contrary takes place when the cone is too flat, and a suitable angle for the conical bottom and for the steps is one which gives a uniform descent of the combustible mass at all points of the gas generator. The movable stepped grate almost entirely fills the lower end of the gas generator and is connected at its base with an ordinary form of trough forming a water seal, preferably with the interposition of a suitable stuffing box for preventing cinders from passing into the mechanism for driving the cone.

In the accompanying illustrative drawings: Figure 1 is a partial vertical section of the lower end of a gas generator, provided with the movable bottom which forms the subject of the present invention. Fig. 2 is an elevation of this grate, and Fig. 3 is a plan of the same.

In these figures *a* is the conical movable grate provided with spiral steps *b* and rotating about the twyer tube *c* through which the incoming air and steam pass. The lower

portion of the cone *a* is supported by rolls which are provided with axles *e* turning in fixed bearings, and the upper portion by means of balls *f* rolling upon a track fast with the twyer tube *c* which forms the axis of the whole system. Thus as above stated the conical form of the grate *a* and the inclination of the thread or steps *b* may vary as desired and they may moreover in each case vary from one point of the cone to the other. In certain cases, especially when the cone *a* is relatively flat, the central series of carrying balls or rollers *f* may be omitted.

The apex of the cone *a* is formed of the cap *g* of the twyer which is also conical and formed with helicoidal steps *h*. Blowing orifices *i* are provided at the lower portion of the cap, which in their rotation distribute the air and steam uniformly throughout the combustible mass. The cap *g* may be fixed but this is usually not advisable.

The lower portion of the cone *a* is provided with teeth *j*, which may be cast with it, with which gear a bevel pinion *k* keyed upon a driving shaft *l*; the shaft *l* is driven in any suitable manner which permits of stopping or reversing when desired the direction of rotation.

The movable grate or cone *a* almost entirely fills the lower end of the gas generator, so as to efficiently expel the burned portions of the charge at the sides; it is connected through its base with a floor *m* of masonry, for example, formed as a basin and filled with water into which an annular plate *n* dips; this plate forms the lower portion of the body of a gas generator of any suitable construction.

As will be seen in the drawings the lower edge of the wall *n* which may be cylindrical or conical is preferably in a line with the outer edge of the cone *a*. This plate *n* forms a water seal while leaving between its lower edge and the floor *m* a space sufficient for the removal of the cinders and slag.

In order to prevent the cinders and other impurities passing into the driving mechanism of the movable grate *a* and consequently hindering its movement, there is arranged at the lower portion of the basin a ring *o* of fiber, wood or other suitable material rubbing upon the periphery of the cone *a* and retained by a metal washer *p* and tightening plate *q*. It is not necessary that this stuffing box *o* should prevent the passage of water contained in the trough *m*, which

may even, especially if care be taken to add a little soap or other lubricant, serve to lubricate the driving parts of the cone *a*. An ordinary stuffing box *r* is in this case arranged upon the shaft *l* at the place where it emerges from the apparatus.

The apparatus works as follows: As the movable grate *a* supports the mass of the fuel decomposed or in process of decomposition in the gas generator, it results that in its movement of rotation, the spiral *b* which forms a support in the form of a screw having one or more threads allows the mass to move downward in a regular manner; the waste cinder and ash portions which reach the trough *m* being pushed outward. If the charge should bind and adhere together it can easily be separated and to a certain extent broken up, by reversing for a short time the direction of rotation of the stepped cone so as to produce a lifting of the mass.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:

1. The combination, with the body of a gas generator, of a grate formed as a rotatable cone having a spirally stepped surface and with its base substantially in the same horizontal plane as the adjacent floor of the generator.
2. The combination, with the body of a gas generator, of a grate formed as a rotatable cone having a spirally stepped surface and with its base substantially in the same horizontal plane as the adjacent floor of the generator, and a twyer arranged axially of the cone and discharging radially near the upper extremity thereof.
3. The combination, with the body of a gas generator, of a grate formed as a rotatable cone having a spirally stepped surface and with its base substantially in the same horizontal plane as the adjacent floor of the generator, and a twyer arranged axially of the cone and terminating in a cap forming the apex of the cone and provided with radial openings.
4. The combination, with the body portion of a gas generator, of a grate formed as a cone having a spirally stepped surface and having its base substantially in the same horizontal plane with the floor of the generator, a twyer arranged axially of the cone, the cone divided into two portions along a horizontal plane, the lower portion rotatably mounted, and the upper portion capping the central twyer and constituting a nozzle therefor with discharge openings, and means to rotate the lower portion of the cone.
5. The combination, with the body portion of a gas generator, of a grate formed as a cone having a spirally stepped surface and having its base substantially in the same horizontal plane with the floor of the generator, a twyer arranged axially of the cone, the cone divided into two portions along a horizontal plane, the lower portion rotatably mounted, and the upper portion capping the central twyer and constituting a nozzle therefor with discharge openings, means to rotate the lower portion of the cone, the floor formed as a basin for water, and the wall of the generator extending downwardly around the cone into the basin.
6. The combination, with the body portion of a gas generator, of a grate formed as a cone having a spirally stepped surface and having its base substantially in the same horizontal plane with the floor of the generator, a twyer arranged axially of the cone, the cone divided into two portions along a horizontal plane, the lower portion rotatably mounted, and the upper portion capping the central twyer and constituting a nozzle therefor with discharge openings, means to rotate the lower portion of the cone, the floor formed as a basin for water, and the wall of the generator extending downwardly around the cone into the basin and terminating substantially in line vertically with the periphery of the cone base.
7. The combination, with the body of a gas generator, of a grate formed as a rotatable cone having a spirally stepped surface and with its base substantially in the same horizontal plane as the adjacent floor of the generator, the floor formed as a basin for water and with an annular recess concentric with the cone, rolls traveling in the recess and supporting the cone, and means to rotate the cone.
8. The combination, with the body of a gas generator, of a grate formed as a rotatable cone having a spirally stepped surface and with its base substantially in the same horizontal plane as the adjacent floor of the generator, the floor formed as a basin for water and with an annular recess concentric with the cone, rolls traveling in the recess and supporting the cone and arranged within a chamber in communication with the basin and adapted to be flooded by the water therein, and means to rotate the cone.
9. The combination, with the body of a gas generator, of a grate formed as a rotatable cone having a spirally stepped surface and with its base substantially in the same horizontal plane as the adjacent floor of the generator, and a twyer arranged axially of the cone and terminating in a cap forming the apex of the cone and provided with radial openings, the twyer provided in its upper portion with a flange having an annular recess therein and the cone having an interior annular recess overlying that in the flange and the two recesses together forming a race-way, anti-friction balls in the race-way and supporting the cone, and means to rotate the cone.

10. The combination, with the body portion of a gas generator, of a grate formed as a cone having a spirally stepped surface and having its base substantially in the same horizontal plane with the floor of the generator, a twyer arranged axially of the cone, the cone divided into two portions along a horizontal plane, the lower portion rotatably mounted, and the upper portion capping the central twyer and constituting a nozzle therefor with discharge openings, the floor formed as a basin for water, and the wall of the generator extending downwardly around the cone into the basin and terminating substantially in line vertically with the periphery of the cone base, the twyer provided in its upper portion with a flange having an annular recess therein and the movable portion of the cone having an interior annular recess overlying that in the flange and the two recesses together forming a race-way, anti-friction balls in the race-way and supporting the cone, the floor formed as a basin for water and with an annular recess concentric with the cone, rolls traveling in the recess and supporting the cone, and means to rotate the cone.

11. The combination, with the body portion of a gas generator, of a grate formed as a cone having a spirally stepped surface and having its base substantially in the same horizontal plane with the floor of the generator, a twyer arranged axially of the cone, the cone divided into two portions along a

horizontal plane, the lower portion rotatably mounted, and the upper portion capping the central twyer and constituting a nozzle therefor with discharge openings, the floor formed as a basin for water, and the wall of the generator extending downwardly around the cone into the basin and terminating substantially in line vertically with the periphery of the cone base, the twyer provided in its upper portion with a flange having an annular recess therein and the cone having an interior annular recess overlying that in the flange and the two recesses together forming a raceway, anti-friction balls in the race-way and supporting the cone, the floor formed as a basin for water and with an annular recess concentric with the cone, rolls traveling in the recess and supporting the cone and arranged within a chamber in communication with the basin and adapted to be flooded by the water therein, and means to rotate the cone.

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

IRENEÉ ALEXIS CHAVANNE.

Witnesses:

J. NEUBY,

EDMOND A. BURRILL.