

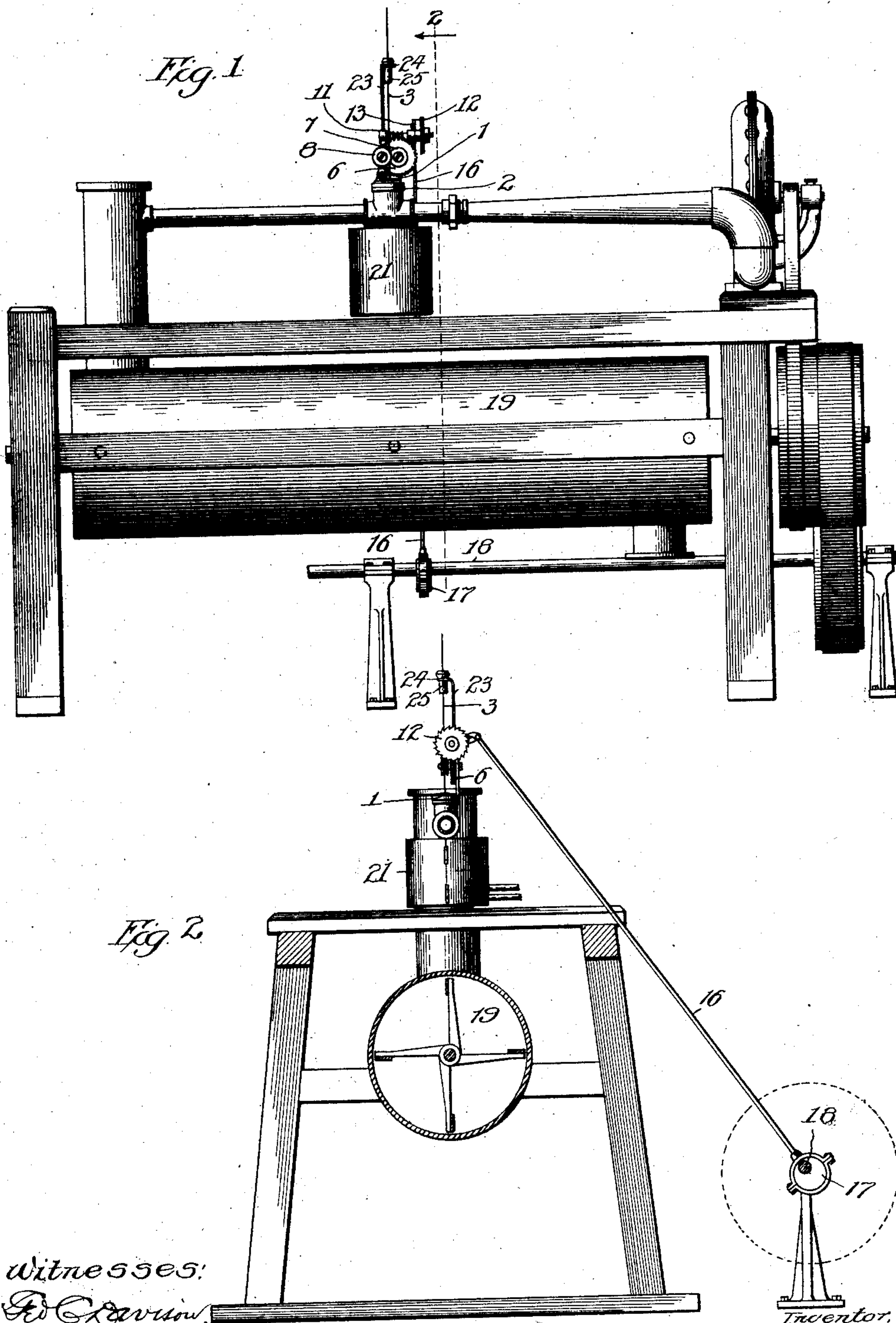
No. 883,189.

PATENTED MAR. 31, 1908.

C. L. GERRARD.
FEED REGULATOR FOR GAS GENERATORS.

APPLICATION FILED SEPT. 6, 1907.

2 SHEETS—SHEET 1.



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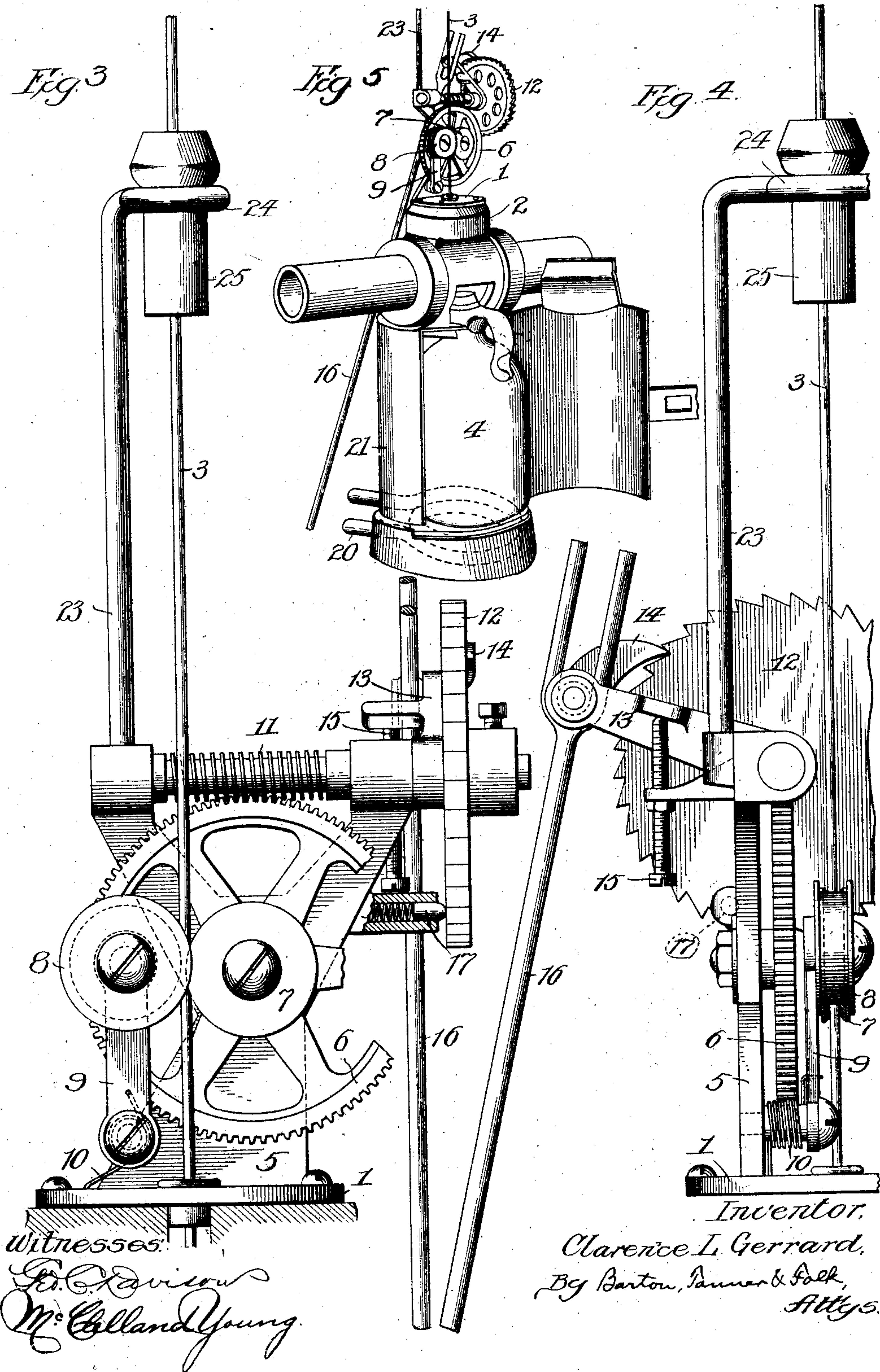
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UNITED STATES PATENT OFFICE.

CLARENCE L. GERRARD, OF COLUMBUS, NEBRASKA.

FEED-REGULATOR FOR GAS-GENERATORS.

No. 883,189.

Specification of Letters Patent.

Patented March 31, 1908.

Application filed September 6, 1907. Serial No. 391,556.

To all whom it may concern:

Be it known that I, CLARENCE L. GERRARD, citizen of the United States, residing at Columbus, in the county of Platte and State of Nebraska, have invented a certain new and useful Improvement in Feed-Regulators for Gas-Generators, of which the following is a full, clear, concise, and exact description.

My invention relates to a feed regulator, and its object is to provide a device which will feed a given chemical substance to a reacting agent in such proportion and under such conditions as will produce the resulting compound in quantities that might be desired.

My invention relates more particularly to a feed device adapted to cooperate with the machine set forth in Letters Patent No. 832,372, issued to me on October 2nd, 1906. The machine of said patent consists of a flour agitator adapted to bring into thorough contact with the flour the gas resulting from feeding an iron wire into nitric acid, the wire in said Letters Patent being shown as fed by gravity. In my present invention the wire is frictionally fed, and the feed thereof is readily regulated to the required rapidity to produce the exact amount of the gaseous agent required. This feed is, moreover, maintained only when the mixing machine is in operation, thereby preventing any unnecessary consumption of materials.

In order that the acid may readily attack the metal it is necessary that said acid may be maintained at a temperature considerably higher than its normal temperature. In case the metal is fed rapidly and continuously into the acid, the heat resulting from the chemical action may be sufficient to maintain the acid at the required temperature. However, my present invention, for purposes of economy, provides means by which in the case of small mills, which use only a small amount of the treating gas, the feed of the metal into the acid is correspondingly slow.

My invention also provides means whereby the feed of the metal ceases when the flour mixing device is not in operation. It may become necessary, therefore, to provide other means than that resulting from the heat of chemical action for maintaining the acid at the required temperature, and especially is this true in case the apparatus is located in an unheated room during cold weather. I have, therefore, in my present invention

provided separate heating means, preferably a steam coil, for applying external heat to the acid, thereby maintaining the acid at the required temperature to permit the graduated rate of feed provided by my feed regulator.

The several features of my invention may be more readily understood by reference to the accompanying drawings, in which

Figure 1 is a side elevation of my feed regulator, showing its use in connection with apparatus for treating flour; Fig. 2 is a section on the line 2 of Fig. 1; Fig. 3 is an enlarged detail view in side elevation of the feed regulator, with parts in section and parts broken away; Fig. 4 is an end elevation of the apparatus shown in Fig. 3; and Fig. 5 is a perspective view of the regulator, showing its application to a gas generator, and also showing means for heating the acid-containing receptacle.

Like parts are designated by similar characters of reference throughout the several views.

The feed regulator of my invention consists of a base 1, adapted to be secured about the opening in the generator head 2. The base is provided with an opening through which the wire 3 is fed into the acid contained in the receptacle 4, the mouth of said receptacle being located within the generator head.

A bracket 5 extending upwardly from the base 1 forms a support for the wire-feeding mechanism. A worm-wheel 6 rotatably supported upon said bracket has secured upon its hub a wheel 7 having a V-shaped groove in its periphery. A wheel 8 is mounted on the end of a lever 9 pivoted upon the bracket 5, and a coiled spring 10 tends to thrust said wheel towards the wheel 7. The wheel 8 preferably has a U-shaped channel in its periphery into which the wheel 7 rides. The wire 3 lies in the V-shaped groove of the wheel 7 and is held in frictional engagement with said wheel by the tension of the spring 10, said wire being thus clamped between the wheels 7 and 8. The V-shaped groove gives the wheel 7 a secure grip upon the wire and permits the use of different sizes of wire. The wire 3 being securely gripped between the wheels 7 and 8 cannot feed downward into the acid except as regulated by the rotation of the wheel 7.

The worm-wheel 6 is driven by a worm 11 having bearings in the bracket 5. A ratchet wheel 12 is affixed to the shaft of said worm

and serves to rotate the same. Loosely pivoted on the worm shaft is a lever or ratchet arm 13 provided at its free end with a pawl 14 adapted to engage the ratchet teeth and rotate the ratchet wheel 12. A screw 15 serves to adjust the stroke of the lever 13 and thus regulate the number of teeth the pawl 14 will take and thereby the amount of rotation of the ratchet wheel for each stroke of the driving pitman 16.

A spring-pressed pin 17 projecting from the bracket 5 frictionally engages the rim of the ratchet wheel 12 and serves the function of a detent to prevent the backing of said ratchet wheel upon the return stroke of the ratchet arm 13.

The pitman 16 is shown as driven by an eccentric on a countershaft 18, which also, through suitable gearing, operates the flour agitator 19. It is obvious that other suitable means of driving the pitman 16 may be employed. The feed of the wire 3 into the acid and consequently the volume of gas generated can thus be readily regulated to correspond with the operation of the flour agitator.

Whether the amount of flour subjected to treatment be large or small, it is apparent that the amount of gas generated can readily be regulated to meet the demand. This is an important feature in view of the well-known fact that, while a certain volume of the gas is indispensable for proper treatment, too much of said gas affects the flour very injuriously.

Projecting upwardly from the bracket 5 is a standard or rod 23 which at its upper end is bent at right angles and formed into a loop 24 for receiving a guide sleeve 25, by which the wire 3 is guided to the wheel 7.

As before stated, when the feed of the wire into the acid is very slow, especially during cold weather, the heat from the chemical action may be insufficient to maintain the acid at the temperature necessary to cause it to attack the wire. I, therefore, preferably provide a steam coil 20 in the bottom of the casing 21. The jug or receptacle 4 rests upon said coil 20 and receives sufficient heat to maintain the acid at the required temperature. In large mills where the feed of the wire is rapid, or in small mills during warm weather, the steam coil may ordinarily be dispensed with.

Having described my invention, I claim:—

1. In a gas generator, the combination with an acid-containing receptacle, of a device for gradually feeding a wire into the acid in said receptacle, said device comprising a feed roller frictionally engaging said wire, and adjustable driving gear for driving said feed roller at a predetermined speed.

2. In a gas generator, the combination with an acid-containing receptacle, of a device for gradually feeding a wire into the acid

in said receptacle, said device comprising a feed roller, a spring-pressed roller cooperating with said feed roller to frictionally grip the wire, a worm-gear for driving said feed roller, and a driving gear provided with adjustable means for regulating the speed at which said worm-gear is driven.

3. In a gas generator, the combination with an acid containing receptacle, of a device for gradually feeding a wire into the acid in said receptacle, said device comprising a feed roller provided with a V-shaped groove in its periphery adapted to receive the wire to be fed, of a spring-pressed roller for holding said wire in frictional engagement with said feed roller, and adjustable driving means for driving said feed roller at a predetermined speed.

4. In a gas generator, the combination with an acid containing receptacle, of a device for gradually feeding a wire into the acid in said receptacle, said device comprising a feed roller provided with a V-shaped groove in its periphery, of an opposing spring-pressed roller having in its periphery a groove in which said feed-roller rides, said rollers being thereby adapted to receive between them and to frictionally grip wires of various sizes, and adjustable means for driving said feed-roller.

5. In a gas generator, the combination with an acid containing receptacle, of a device for gradually feeding a wire into the acid in said receptacle, said device comprising a feed-roller arranged to engage and in its rotation to feed a wire, a worm-gear for driving said feed-roller, a ratchet-wheel for operating said worm-gear, a ratchet-arm carrying a pawl for engaging the teeth of said ratchet-wheel, a set-screw for regulating the throw of the ratchet-arm and thereby the number of teeth said ratchet-wheel is rotated for each stroke of the ratchet-arm, and means for reciprocating said ratchet-arm.

6. In a gas generator, the combination with an acid containing receptacle, of a device for gradually feeding a wire into the acid in said receptacle, said device comprising a feed-roller arranged to frictionally engage a wire to feed the same, a worm-wheel provided with a hub upon which said feed-roller is secured, a worm-shaft for driving said worm-wheel, a ratchet-wheel secured upon said worm-shaft, a ratchet-arm loosely mounted on said worm-shaft, a pawl carried thereby for engaging the teeth of said ratchet-wheel, a set-screw for regulating the throw of the ratchet-arm and thereby the number of teeth said ratchet-wheel is rotated for each stroke of the ratchet-arm, and means for reciprocating said ratchet-arm.

7. In a gas generator, the combination with an acid containing receptacle, of a device for gradually feeding a wire into the

acid in said receptacle, said device comprising a feed-roller arranged to frictionally engage a wire to feed the same, a worm-wheel provided with a hub upon which said feed-roller is secured, a worm-shaft for driving said worm-wheel, a ratchet-wheel secured upon said worm-shaft, a ratchet-arm loosely mounted on said worm-shaft, a pawl carried thereby for engaging the teeth of said ratchet-wheel, a set screw for regulating the throw of the ratchet-arm and thereby the number of teeth said ratchet-wheel is rotated for each stroke of the ratchet-arm, a spring-pressed plunger engaging upon the side of the ratchet wheel and acting as a detent therefor.

8. In a gas generator, the combination with an acid containing receptacle, of a device for gradually feeding a wire into the acid in said receptacle, said device comprising a feed-roller provided with a V-shaped groove in its periphery adapted to receive the wire to be fed, of a spring-pressed roller for holding said wire in frictional engagement with said feed roller, a worm-wheel provided with a hub upon which said feed-roller is secured, a worm shaft for driving said worm-wheel, a ratchet-wheel secured upon said worm-shaft, a ratchet-arm loosely mounted on said worm-shaft, a pawl carried thereby for engaging the teeth of said ratchet-wheel, a set-screw for regulating the throw of the ratchet-arm and thereby the number of teeth said ratchet-wheel is rotated for each stroke of the ratchet-arm, a spring-pressed plunger engaging upon the side of the ratchet-wheel and acting as a detent therefor, and means for reciprocating said ratchet-arm.

9. In a gas generator, the combination

with an acid-containing receptacle, a generator-head inclosing the mouth of said receptacle, a plate forming a cover for said generator-head, said plate having an opening through which a wire is fed into said acid, a bracket extending vertically from said plate, feed-roller provided with a V-shaped groove in its periphery adapted to receive said wire, a spring pressed roller carried by said bracket and holding said wire in frictional engagement with said feed-roller, a worm-wheel journaled in said bracket, said worm-wheel being provided with a hub upon which said feed-roller is secured, a worm-shaft for driving said worm-wheel, a ratchet-wheel secured upon said worm-shaft, a ratchet-arm loosely mounted on said worm-shaft, a pawl carried thereby for engaging the teeth of said ratchet wheel, a set-screw for regulating the throw of the ratchet-arm, and thereby the number of teeth said ratchet-wheel is rotated for each stroke of the ratchet-arm, a spring-pressed plunger projecting from said bracket into frictional engagement with said ratchet wheel, and means for reciprocating said ratchet arm.

10. In a gas generator, the combination with an inclosing case, a heat-coil arranged in the bottom thereof, an acid-containing receptacle resting upon said heat-coil, and a wire-feeding device for gradually feeding a wire into the acid in said receptacle.

In witness whereof, I hereunto subscribe my name this 3d day of September, A. D. 1907.

CLARENCE L. GERRARD.

Witnesses:

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EILERT MOHLMANN.