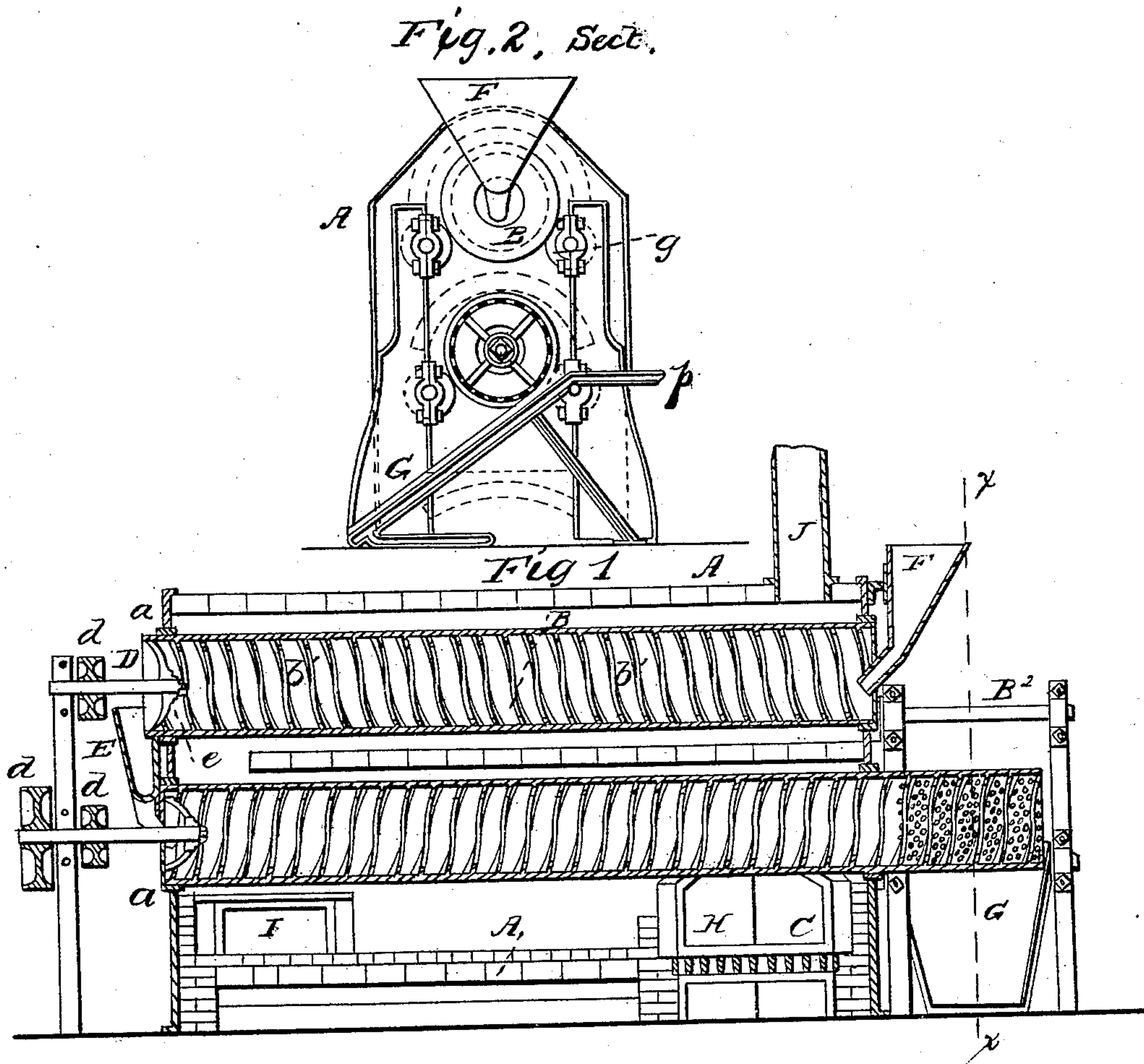


F. GODFREY.
Furnace for Calcining Gypsum.

No. 57,892.

Patented Sept. 11, 1866.



Witnesses:
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UNITED STATES PATENT OFFICE.

FREEMAN GODFREY, OF GRAND RAPIDS, MICHIGAN.

IMPROVED FURNACE FOR CALCINING GYPSUM.

Specification forming part of Letters Patent No. 57,892, dated September 11, 1866.

To all whom it may concern:

Be it known that I, FREEMAN GODFREY, of Grand Rapids, in the county of Kent and State of Michigan, have invented a new and Improved Apparatus for Calcining Gypsum; and I do hereby declare the following to be a full, clear, and exact description of the nature, construction, and operation of the same, reference being had to the accompanying drawings, which are made a part of this specification, and in which—

Figure 1 is a vertical longitudinal section through the center of my improved apparatus. Fig. 2 is a sectional end elevation of the same, line *x x*, Fig. 1, indicating the plane of section.

Similar letters of reference indicate corresponding parts in the two figures.

Under the ordinary mode gypsum is calcined in considerable quantities at a time in a large stationary boiler or heater, in which the gypsum is subjected to the action of the heat for a sufficient length of time to be converted into a calx, when it is permitted to run off in a body through a door or gate thrown open for that purpose. An arm or rake near the bottom of this boiler is turned around by a vertical shaft, to agitate the gypsum or plaster and prevent the same from being burnt by remaining against the sides or bottom of the boiler; but in consequence of the large amount of plaster within the boiler a perfect calcination cannot be effected, as the plaster is not acted upon equally by the heat.

The object of my invention is to effect a more perfect calcination by subjecting the plaster or gypsum to the action of the heat in small quantity at a time, and keeping it in a state of progression in the boiler or boilers in which it is heated.

I employ two rotary boilers, located within a fire-arch, and provided with spiral conveyers, whereby the plaster is caused to travel through one boiler and discharge through a spout into the other, and thence to a distributing device, which deposits the plaster on a cooling-surface in a condition to be packed in barrels.

The following detail description, in connection with the accompanying drawings, will enable others skilled in the art to which my invention appertains to fully understand and use the same.

A represents a double-flue fire-arch; and B B, two cylindrical boilers or heaters, which are almost entirely inclosed within the respective flues. C is the fire-grate, located beneath the lower boiler, B', near the forward end of the latter. The ends of the boilers B B, or, rather, the bearing-points near their ends, on which they rotate, are provided with rings or collars *a a*, which are intended to form an approximately fire-tight joint, and at the same time enable the boilers to rotate freely.

D D are driving-shafts, provided with pulleys *d*, and attached each to a spider, *e*, the latter being a set of radial metallic arms fixed in the driving end of each boiler, and adapted to readily admit of expansion and contraction by heat, and at the same time afford full communication from one boiler to another through the spout E.

F is a spout whereby the gypsum is fed into the upper boiler, B, through the opening *b* in the head of said boiler. *g g* are friction-rollers, upon which the rings or collars *a* on the forward ends of the boilers are allowed to rotate, these rollers being intended to diminish the friction and admit of any movement of the bearing-points, which may be due to expansion and contraction by heat.

The projecting extremity B² of the lower boiler, B', is perforated, and constitutes a distributor, which delivers the plaster from the action of the heat and deposits it on a cooling device, G. The latter consists of a double plate of thin metal, the hollow interior of which is supplied with cold water through the pipe *h*, (see Fig. 2,) *h'* being the pipe through which the water passes off. This cooling device G is placed in an inclined position directly beneath the distributor B².

The cylindrical heaters B B' are each provided with a spiral flange, *b'*, extending throughout their entire length, and employed to convey the plaster through the heaters B B', in the manner to be explained.

H is the fire-box door, and I is a door opening into the lower flue, and employed to regulate the heat. J is the chimney or pipe through which the products of combustion escape from the fire-arch A.

The operation is as follows: The plaster or ground gypsum is fed into the upper heater, B, through the pipe F, and is conveyed along

through the latter by the spiral flange or conductor *b'*, and being discharged through the rear end of cylinder B into spout E it is discharged into the lower heater, B', whose spiral conductor *b'* conveys it to the distributor B². From the distributor B² the plaster is sprinkled upon the cooling device G, upon which it descends in a thin sheet.

The plaster may be received from the cooling device G by an elevator, to be conveyed to a packer. At all events, when it leaves G it is in a condition to be packed in barrels.

The plaster is subjected to a gradually-increasing heat as it is conveyed through the heaters B B', the point where it is fed in being farthest removed from the fire.

The spiral conductors *b'* carry the plaster along in small quantity as fast as it is supplied to the boilers, thus keeping it in a state of constant agitation, and the steam, with the sulphuric-acid gas which is generated during the process, rises to the upper part of the heaters and escapes at the open ends of the latter.

Having thus described my invention, the following is what I claim as new and desire to secure by Letters Patent.

1. In an apparatus for calcining gypsum, one, two, or more rotary boilers, substantially as and for the purpose specified.

2. A distributor, B², arranged and operating substantially as described.

3. A spiral conveyer, *b'*, located within the heater, and operating substantially as described.

4. A cooler, G, constructed, arranged, and operating substantially as described.

5. The combination and arrangement of the fire-arch A, heaters B B', rings or collars *a*, friction-rollers *g*, spiders *e*, and driving-shafts D D, as and for the purpose specified.

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Witnesses:

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