

No. 654,877.

G. DEVAUX & H. DIEDRICH.
DESICCATING APPARATUS.

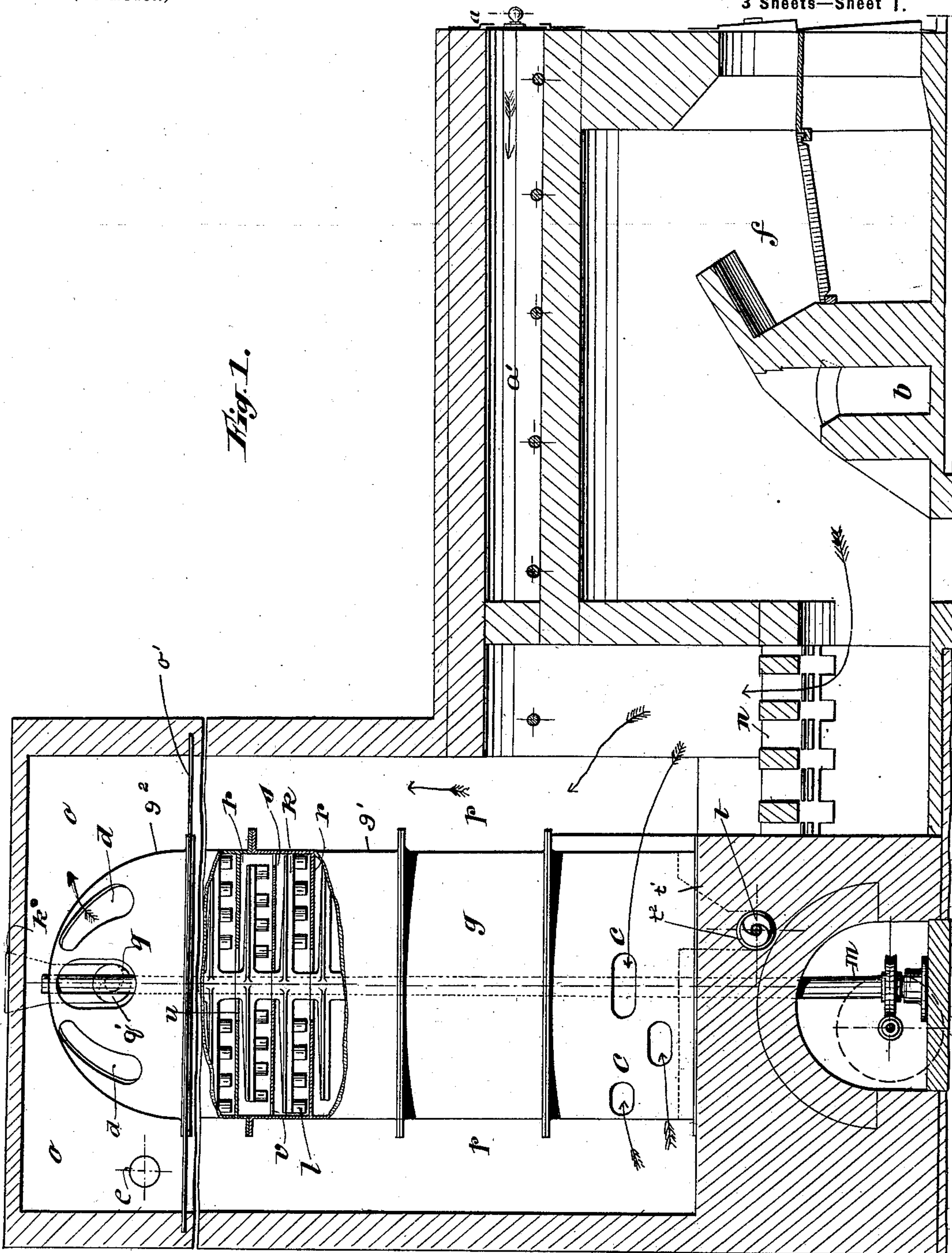
Patented July 31, 1900.

(Application filed Dec. 6, 1899.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

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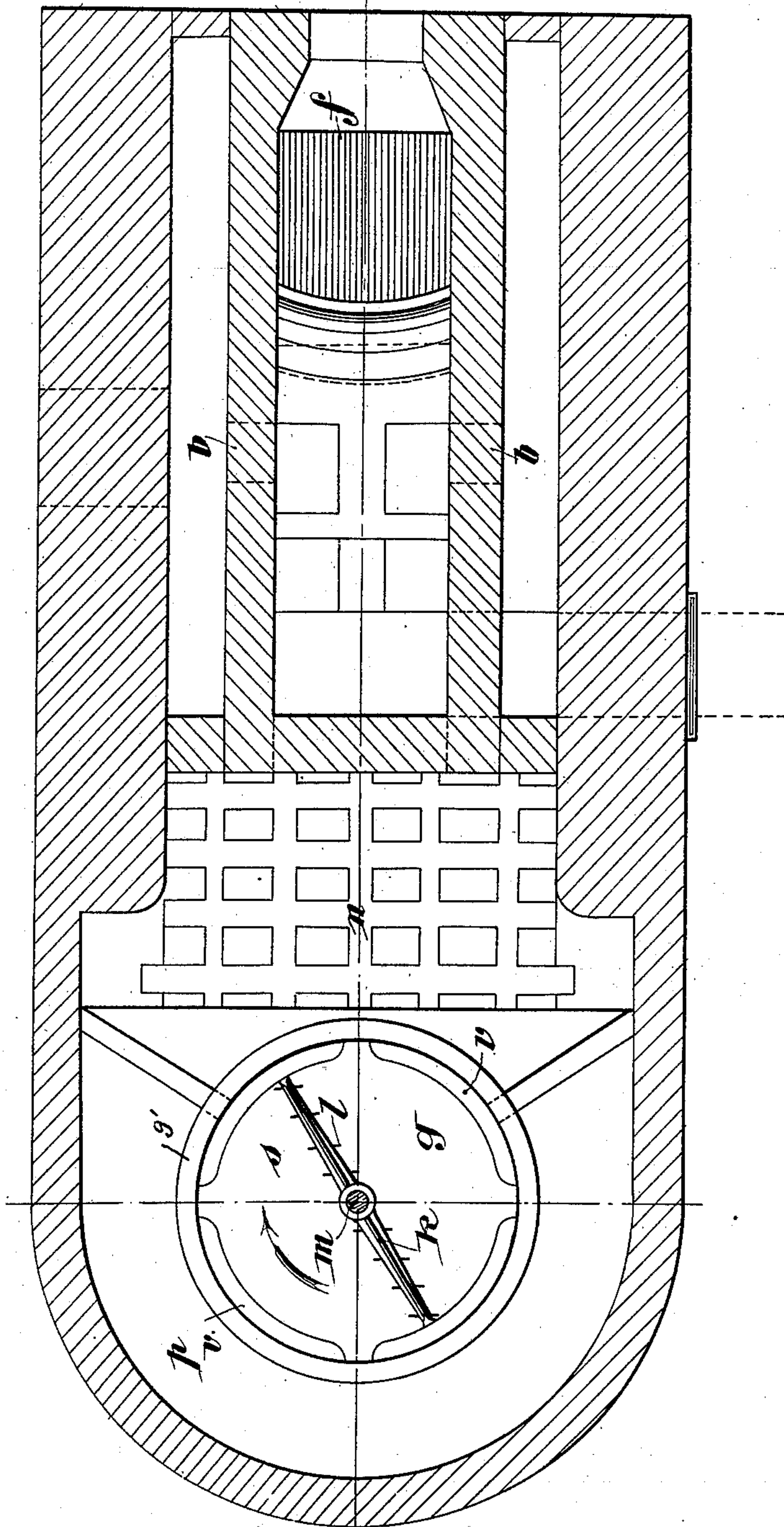
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Fig. 2.



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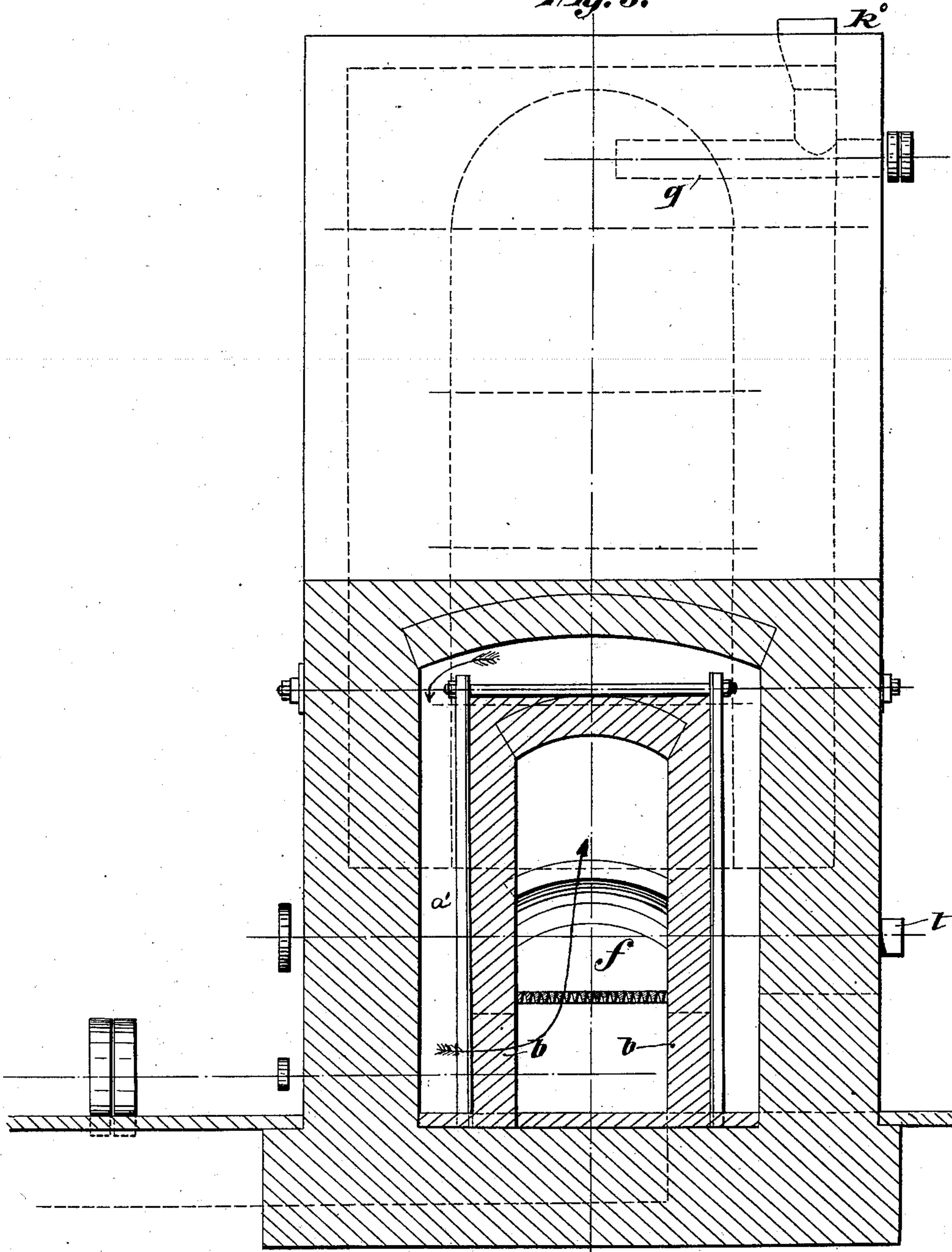
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(No Model.)

3 Sheets—Sheet 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

GASTON DEVAUX, OF BRETEUIL, AND HENRY DIEDRICH, OF PARIS, FRANCE.

DESICCATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 654,877, dated July 31, 1900.

Application filed December 6, 1899. Serial No. 739,403. (No model.)

To all whom it may concern:

Be it known that we, GASTON DEVAUX, residing at Breteuil, (Oise,) and HENRY DIEDRICH, residing in Paris, Republic of France, citizens of France, have invented certain new and useful Improvements in Desiccating Apparatus; and we do hereby declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same, reference being made to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an apparatus for desiccating granular and slimy or pasty materials reduced to small fragments, and is especially applicable for desiccating phosphates, superphosphates, ore, dregs, grains, marl, and the like.

The object of the invention is to provide such an apparatus of simple, strong, and durable construction, efficient and reliable in operation.

The invention consists in the improved desiccating apparatus and in the combination and arrangement of the various parts thereof, substantially as will be hereinafter more fully described and finally embodied in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several figures, Figure 1 is a longitudinal sectional view through our improved desiccating apparatus, certain parts being broken away and others removed to better illustrate the nature of our invention. Fig. 2 is a horizontal sectional view through the apparatus and more clearly illustrating the construction of the furnace forming a part of the same, and Fig. 3 a cross-sectional view through the furnace.

In said drawings, *f* represents a furnace having its central portion surrounded by a cold-air chamber *a'*, into which air is admitted through the regulating port or inlet *a*, which latter is provided with a door or cover of any suitable and well-known construction. Said cold-air chamber communicates through ports *b b* with the flue or combustion chamber of the furnace *f*, in which latter the air and the

gases coming from the furnace are intermingled or mixed. At the rear of the furnace is arranged the column or desiccating chamber *g*, which will be hereinafter more fully described and which is surrounded by a circular channel or chamber *p*, into which latter the mixed air and gases from the furnace are passing through the grid *n*, as can be best seen in Fig. 1 of the drawings.

The column or desiccating chamber *g* consists of a cylindrical casing *g'*, provided in its lower portion with a series of inlet-openings *c c* and having its upper portion closed by a dome or cap *g²*, provided with outlet-openings *d*. Said dome or cap *g²* is likewise surrounded by a channel or chamber *o*, separated from the channel or chamber *p* by a plate or partition *o'* and provided at one side with an outlet *e*, adapted to be connected with any suitable exhaust. In other words, said outlet *e* forms the exhaust for the chamber *o*. The desiccating column or chamber *g* is penetrated by a shaft *m*, having suitable bearings in the apparatus and carrying securely mounted thereon a series of radially-arranged arms *k*, provided with downwardly-extending plows or pedals *l*. It must be remarked that the pedals on one series of arms are arranged in opposite direction to the pedals on the adjacent series of arms, and, further, that each series of arms and pedals is separated from its adjoining series by plates *r s*, provided, respectively, in its central portion with a circular opening *u* and near its outer periphery with elongated openings *v*, for a purpose hereinafter described. In the top portion of the chamber *o* is arranged a funnel or hopper *k⁰*, communicating through a pipe *q* with the dome or cap *g²*. In said pipe *q* is arranged a spiral screw *q'*, (shown in front elevation in Fig. 1,) by means of which latter the material to be desiccated is forced from the hopper into the dome and desiccating-chamber. In the bottom of the desiccating-chamber *g* is likewise arranged a hopper *t'*, communicating with the exterior of the apparatus through a tube or pipe *t²*, in which is also arranged a spiral screw *t* for the purpose of discharging the desiccated material from the column *g*.

In operation the material to be desiccated

is inserted into the hopper k^0 and is forced from the latter by means of the spiral screw into the desiccating-chamber g and will drop on the top plate r in said chamber. By the rotation of the shaft said material is agitated through the respective pedals l , and on account of their peculiar position on the arms k is forced gradually toward the center of said plate and is discharged through the circular opening u of the latter onto the adjacent plate s . The material is now again agitated by the respective pedals l and arms k , cooperating with said plate s , and is on account of the peculiar position of said pedals (being in opposite direction to the pedals on the arms above) gradually moved toward the outer edge of said plate s and is afterward discharged through the elongated openings v of the latter onto the plate r below. This operation is continued until the material reaches the bottom of the desiccating-chamber, when it enters the hopper t' and is forced by means of the spiral screw t out of the apparatus, as will be manifest. While the material is being agitated and mixed the combined heated air and gases from the furnace f passes through the grid n into the chamber p , and from the latter through the inlets $c c$ into the desiccating-column g , traverses the latter in an upward direction, and passes through the outlets d of the dome g^2 into the chamber o , and from the latter through the exhaust e into the atmosphere. It must be remarked that the temperature of the heated air and gases is kept comparatively low and uniform, and the object of said comparatively-low temperature is to permit a thorough desiccation of such materials as are injured by coming into contact with hot gases. While the mixed air and gases are passing through the column g the moisture of the material to be desiccated is completely absorbed.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A desiccating apparatus consisting of a column or chamber provided at or near its lower portion with inlet-openings, a dome or cap on the top of said column and communicating therewith and provided with outlet-openings, a series of parallel plates in the column—one above the other and each provided with a central opening, a second series of parallel plates alternately arranged with the plates of the first-mentioned series and each provided near its outer periphery with holes or openings, a revolving shaft penetrating said plates and column, a series of arms mounted on said shaft and between adjacent plates and provided with downwardly-extending pedals, the pedals of one series being arranged in opposite direction to the pedals of the adjacent series, a chamber or channel surrounding the column, a second chamber or channel surrounding the dome or cap and

provided with an exhaust-outlet, said second-mentioned chamber or channel being separated from the first-mentioned chamber or channel but communicates with the dome, and a furnace communicating with the first-mentioned chamber or channel, substantially as described. 70

2. A desiccating apparatus consisting of a column or chamber provided at or near its lower portion with inlet-openings, a dome or cap on the top of said column and communicating therewith and provided with outlet-openings, a series of parallel plates in the column—one above the other and each provided with a central opening, a second series of parallel plates alternately arranged with the plates of the first-mentioned series and each provided near its outer periphery with holes or openings, a revolving shaft penetrating said plates and column, a series of arms mounted on said shaft and between adjacent plates and provided with downwardly-extending pedals, the pedals of the one series being arranged in opposite direction to the pedals of the adjacent series, a chamber or channel surrounding the column, a second chamber or channel surrounding the dome or cap and provided with an exhaust-outlet, said second-mentioned chamber or channel being separated from the first-mentioned chamber or channel but communicates with the dome, a furnace communicating with the first-mentioned chamber or channel, a hopper in the second-mentioned chamber or channel communicating with the dome, and a second hopper in the bottom of the column and communicating with the exterior of the apparatus, substantially as described. 85 90 95 100

3. A desiccating apparatus consisting of a column or chamber provided at or near its lower portion with inlet-openings, a dome or cap on the top of said column and communicating therewith and provided with outlet-openings, a series of parallel plates in the column—one above the other and each provided with a central opening, a second series of parallel plates alternately arranged with the plates of the first-mentioned series and each provided near its outer periphery with holes or openings, a revolving shaft penetrating said plates and column, a series of arms mounted on said shaft and between adjacent plates and provided with downwardly-extending pedals, the pedals of one series being arranged in opposite direction to the pedals of the adjacent series, a chamber or channel surrounding the column, a second chamber or channel surrounding the dome or cap and provided with an exhaust-outlet, said second-mentioned chamber or channel being separated from the first-mentioned chamber or channel but communicates with the dome, a furnace communicating with the first-mentioned chamber or channel, a hopper communicating with the dome, an endless screw 105 110 115 120 125 130

intermediate the hopper and dome, and coöperating with said hopper, a second hopper in the bottom of the column, a discharge-tube communicating with said second hopper, and
5 an endless screw in said discharge-tube, substantially as and for the purposes described.
In testimony that we claim the foregoing we

have hereunto set our hands this 20th day of November, 1899.

GASTON DEVAUX.
HENRY DIEDRICH.

Witnesses:

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GEORGE E. LIGHT.