

No. 885,360.

PATENTED APR. 21, 1908.

L. MOURGEON.
 DRYING APPARATUS.
 APPLICATION FILED JULY 6, 1807.

2 SHEETS—SHEET 1.

Fig. 1.

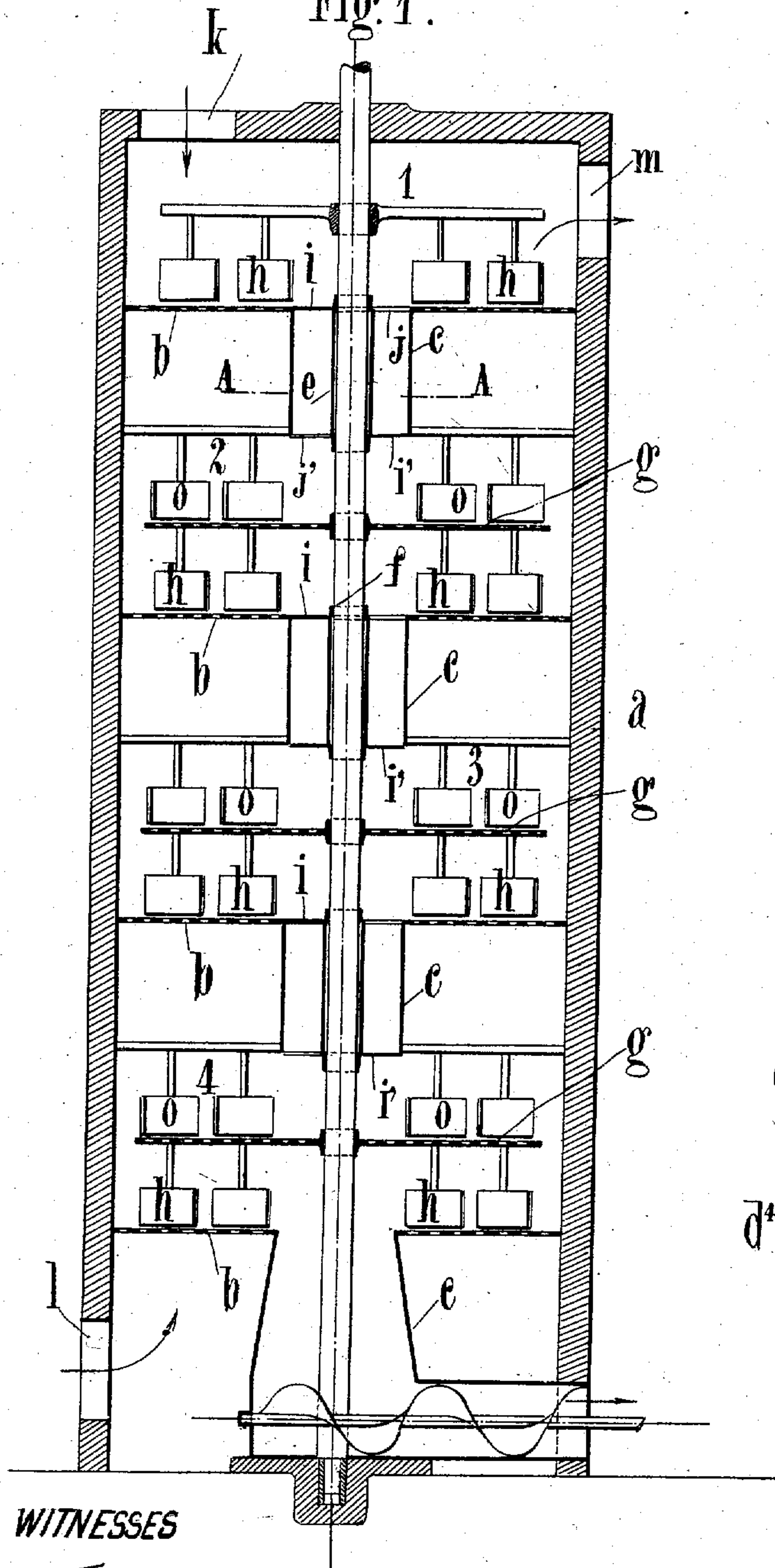


Fig. 3.

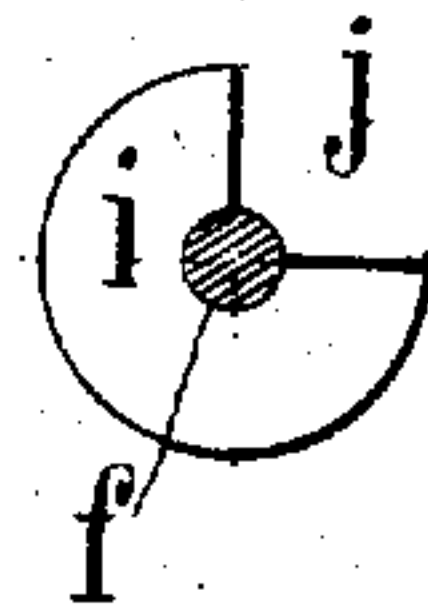


Fig. 4.

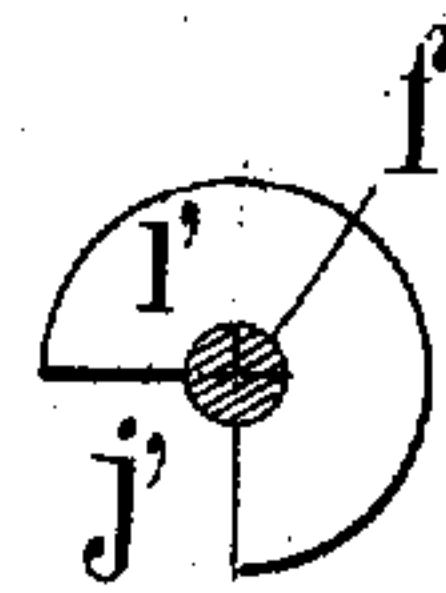
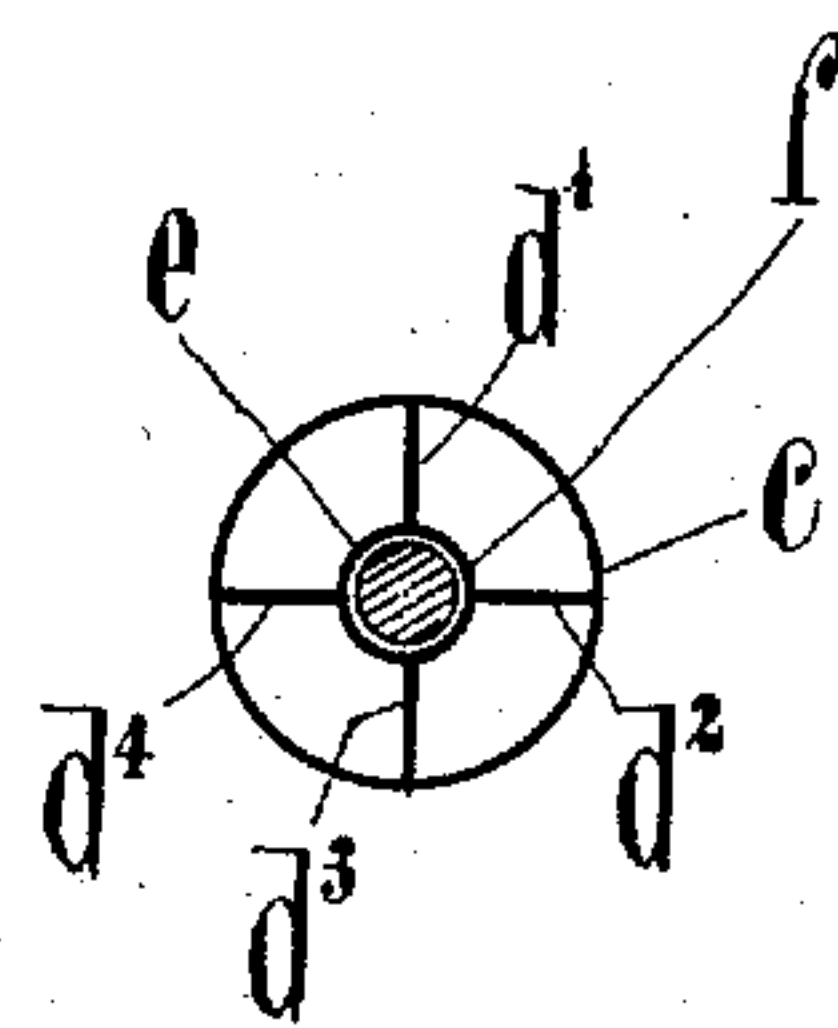


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 5.

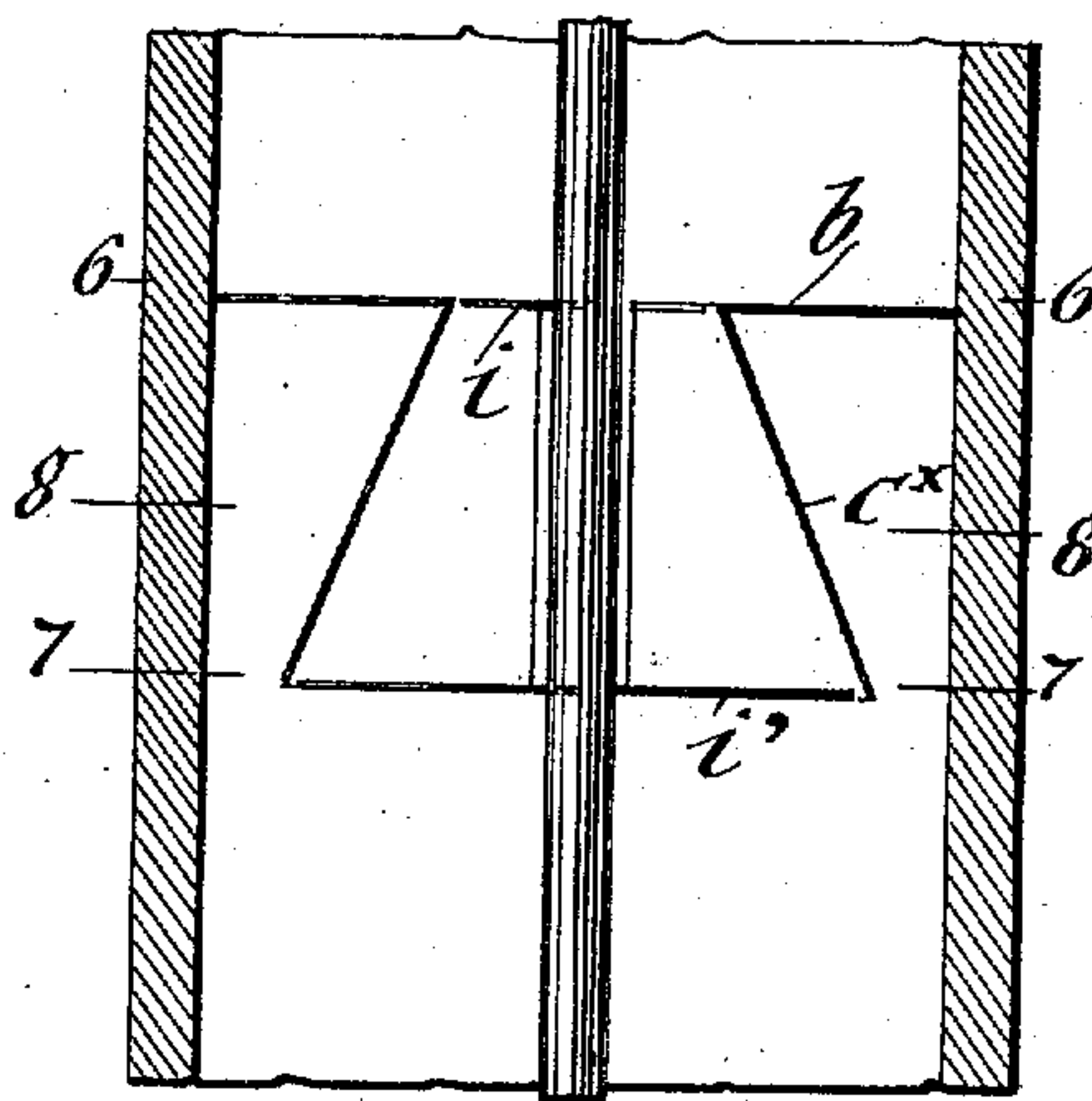


Fig. 6.

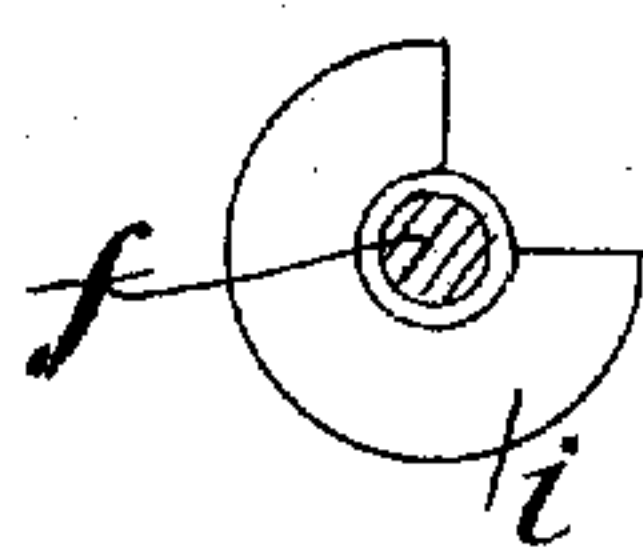


Fig. 7.

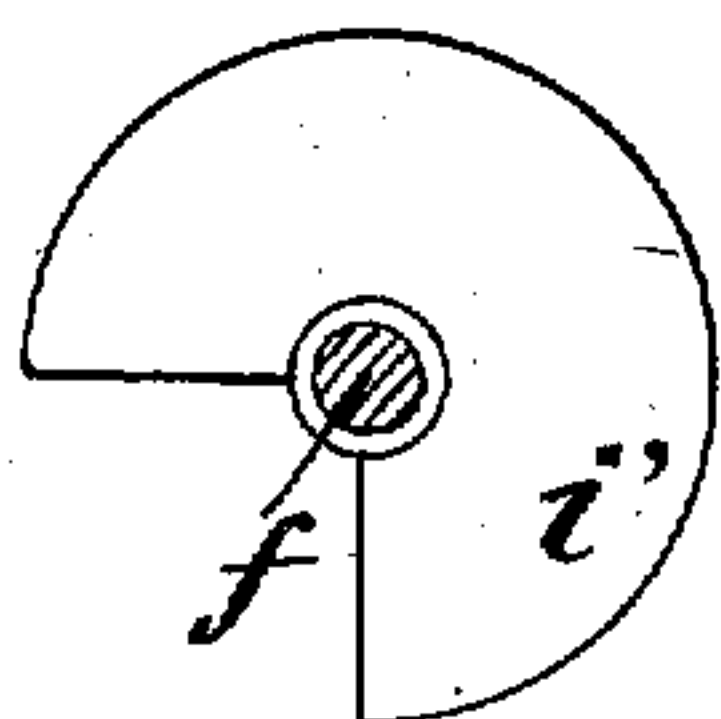
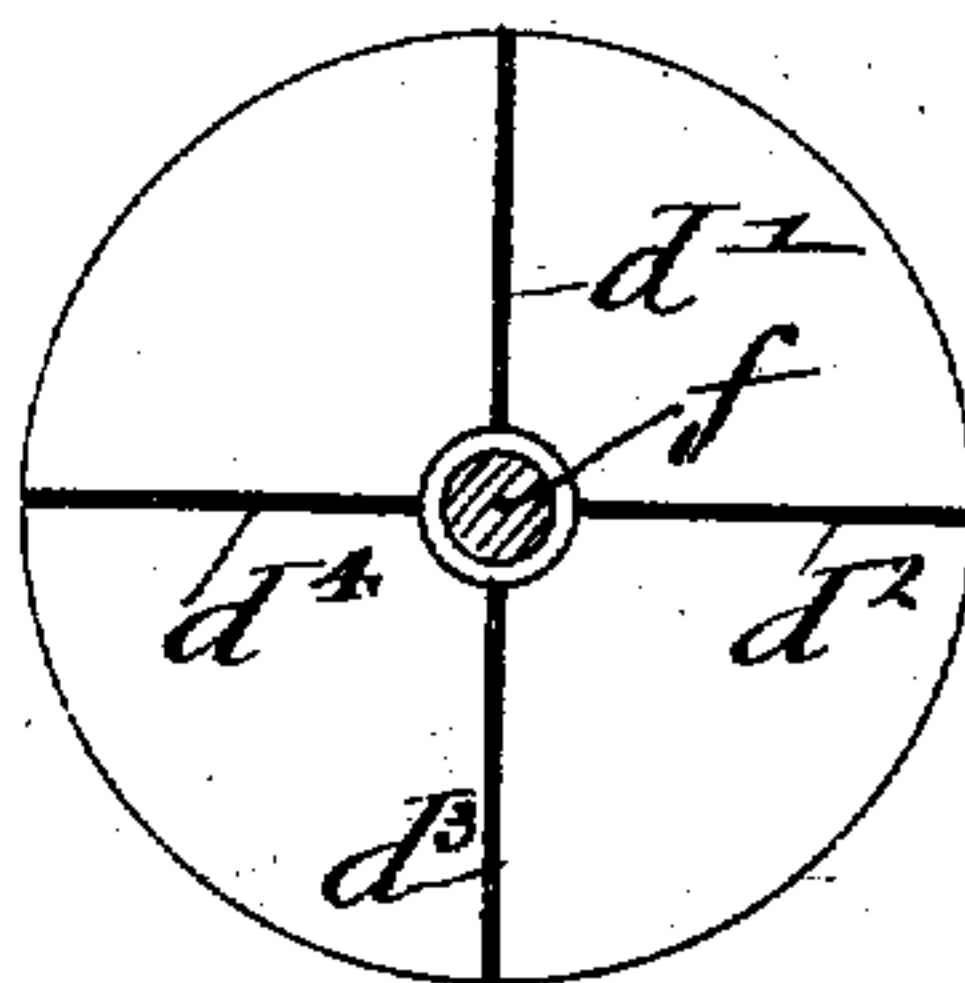


Fig. 8.



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UNITED STATES PATENT OFFICE

LÉON MOURGEON, OF SURESNES, FRANCE, ASSIGNOR TO ALPHONSE HUILLARD,
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DRYING APPARATUS.

No. 885,360.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed July 6, 1907. Serial No. 382,542.

To all whom it may concern:

Be it known that I, LÉON MOURGEON, a citizen of the Republic of France, residing in Suresnes, France, have invented certain new and useful Improvements in Drying Apparatus, of which the following is a specification.

Drying of moist materials is a very frequent operation in most industries, and it is necessary, from the point of view of economy, to be able to obtain complete and quick drying so as to avoid the accumulation of the material for a very long time, which occupies a considerable amount of space.

This invention relates to an apparatus for quick drying, enabling any moist materials to be dried, provided that they are neither in very large pieces nor in the form of a very fine powder. This apparatus enables the process to be carried out in practice in a very simple manner, the said process consisting in causing the material which is to be dried to move in one direction in very thin layers at the same time subjecting it to the action of a hot fluid circulating in the opposite direction.

The apparatus according to this invention is illustrated, by way of example, in the accompanying drawing.

Figure 1 is a vertical section showing the complete apparatus. Fig. 2 is a horizontal cross-section on line A—A of Fig. 1. Figs. 3 and 4 are plans of disks mounted on the central spindle of the apparatus. Fig. 5 is a detail vertical section of a modified form of the apparatus, and Figs. 6, 7 and 8 are sections on lines 6, 6, 7, 7, 8, 8 respectively of Fig. 5.

The apparatus chiefly comprises a cylindrical tower *a* divided into chambers 1, 2, 3, 4 etc., by perforated fixed horizontal partitions *b*. The perforations in the said partitions are such that, while admitting hot air passing through the apparatus in the upward direction, they prevent direct passage from one chamber into the other of the material to be dried. Each horizontal partition has an opening in the center, and the edge of the said opening is secured to a cylinder *c* opened at both ends.

Each cylinder *c*, as shown in Fig. 2, is divided into vertical compartments by radial partitions *d*¹, *d*², *d*³, *d*⁴. These radial partitions are connected to a central socket *e* through which passes the vertical spindle *f* extending throughout the whole height of the apparatus. The vertical spindle receives a

rotary movement by means of any suitable gear.

On the said spindle are mounted:—

1. Perforated disks *g* of a diameter smaller than that of the tower, provided underneath with scrapers *h*, which being driven by the spindle, move above the fixed partitions *b*; the said scrapers are arranged so as to push from the circumference towards the center the material situated on the partitions *b*.

2. Disks *i* and *i'* with a sector cut out. The disks *i* and *i'* each of which is provided with an opening *j* or *j'* are mounted one on each end of the cylinders *c*. The disks *i* and *i'* are keyed to the spindle *f* in such manner that the openings are at an angle of 180° relatively to each other. It follows therefrom that, if one cylinder *c* is considered, one of its compartments could never be opened at the same time at both its ends. In fact, if the open sector *j* of the upper disk *i* coincides with the upper opening of one of the compartments of the cylinder *c*, the sector *j'* arranged at 180° relatively to the sector *j*, will not coincide with the bottom opening of the same compartment, and vice-versa.

Above each of the disks *g* are suspended from arms secured to the cylinder *c* and wall of the tower, fixed scrapers *o* arranged in such manner that the material falling on the disks *g* should be forced to travel from the center towards the circumference. At the bottom portion of the vertical tower is arranged an automatic extractor of dried material, for instance a screw conveyer. The moist material is introduced into the apparatus through the upper opening *k*. Hot air enters through the bottom opening *l* and escapes through the upper opening *m*.

The working of the apparatus is as follows:—The hot air passes through the apparatus in the upward direction and the vertical spindle *f* rotates in a uniform manner at a speed depending on the nature of the material to be treated. The material to be dried is introduced into the apparatus through the opening *k*, falls on the first horizontal partition *b*, the perforations of which are too small to allow the material to fall direct on the partition arranged immediately below. On the said first partition, the material is submitted to the action of the scrapers *h* which constantly bring the material back towards the center where, through the open sector *j* of the

movable disk i , it fills successively the compartments of the cylinder c . The said compartments are emptied also owing to the sector j^1 of the movable disk i^1 arranged at the bottom of the cylinder, but as already stated above, a compartment cannot be emptied except when it is closed at the top by a solid portion of the disk i . The material escaping from one of the compartments of the cylinder c falls on the movable disk g , and the fixed scrapers o return the material towards the circumference of the disk whence it falls on the second horizontal partition b where it is subjected to the action of the scrapers h as on the first horizontal partition, which brings it toward the center into the compartments of the second cylinder. The material thus travels in the downward direction in the apparatus, spreading in a thin layer on each horizontal partition where the rising hot air passes through it, while on the contrary the said material passes in a compact mass from one partition to another through the compartments of the different cylinders which are not accessible to the hot air. At the bottom of the apparatus the dried material is removed by a worm conveyer.

It will be understood that, without in any way modifying the working of the apparatus, the cylinder c could be replaced by truncated cones c^x secured to the horizontal partitions b , the said truncated cones having the small base at the top and, in the same way as the cylinders, being open at both ends. This arrangement is shown in Figs. 5-8. The disks i would in that case be mounted on the fixed partitions b and would fill the central opening and the disks i^1 would be mounted on the large bases of the truncated cones.

Having thus described my invention, I claim:

1. In a drying apparatus, the combination of a partition having an opening, an open-

ended cylinder fixed in said opening, a shaft passing through said cylinder, and disks on said shaft at opposite ends of said cylinder to control the passage of material through the latter.

2. In a drying apparatus, the combination of a fixed horizontal partition having an opening, a shaft passing through said opening, an open-ended cylinder fixed in said opening and divided into compartments, and means mounted on said shaft at opposite ends of the cylinder to control the passage of the material through said compartments.

3. In a drying apparatus, the combination of a partition having an opening, an open-ended cylinder fixed in said opening and divided into a plurality of vertically extending compartments, a rotary shaft passing through said cylinder, and disks on said shaft at the ends of said cylinder and having cut-out portions so arranged that when each compartment is open at one end it is closed at the opposite end.

4. In a drying apparatus, the combination of a horizontal partition having an opening, an open-ended cylinder having its upper edge fixed to the edge of said opening, partitions which divide said cylinder radially into a plurality of vertically disposed compartments, an upright shaft passing centrally through said cylinder, and disks mounted on said shaft and extending over the ends of said cylinder, said disks having sector-shaped cut-away portions out of vertical alinement with each other.

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

LÉON MOURGEON.

Witnesses:

EMILE LEDRET.

H. C. COXE.