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PATENTED OCT. 15, 1907.

R. G. PONCET.
ROTARY DRYING MACHINE.
APPLICATION FILED FEB. 16, 1907.

2 SHEETS—SHEET 1.

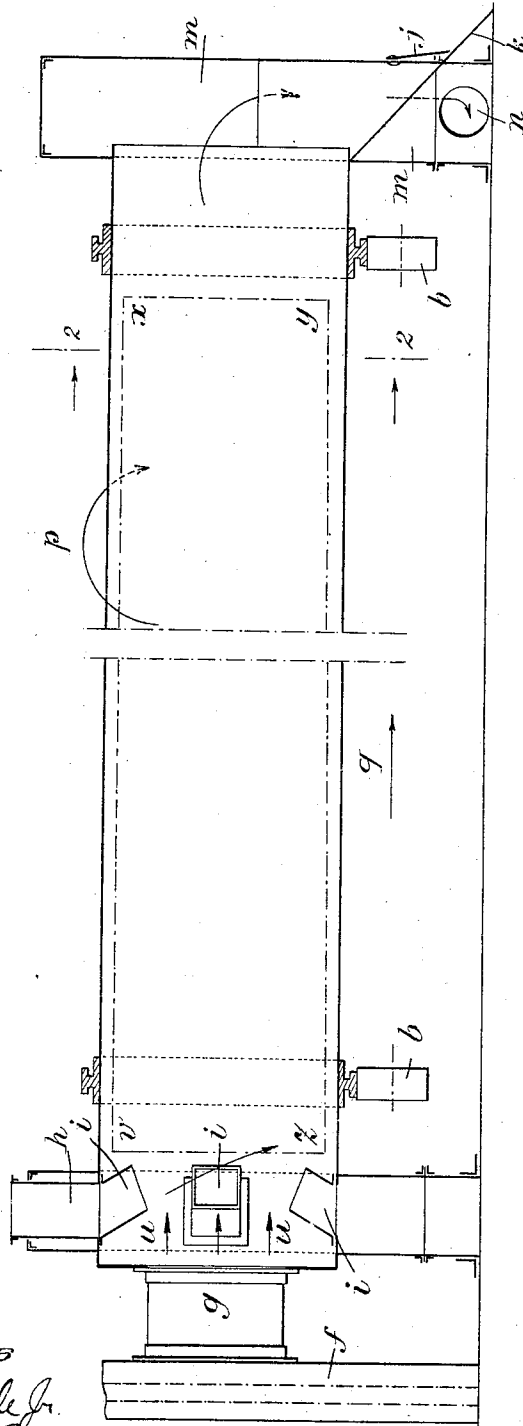


Fig 1

Witnesses

Al. W. Heale Jr.
Geo. A. Bepae.

Inventor
R. G. Poncet, by
Wilkinson & Fisher
Attorneys.

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2 SHEETS—SHEET 2.

Fig 4

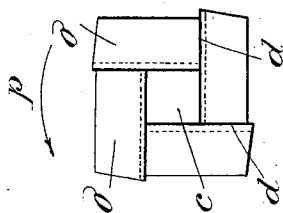


Fig 2

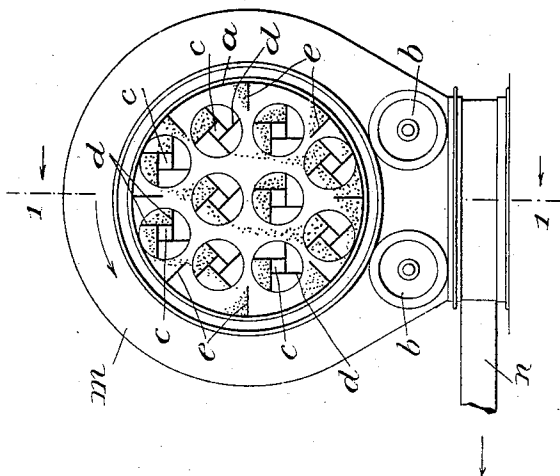
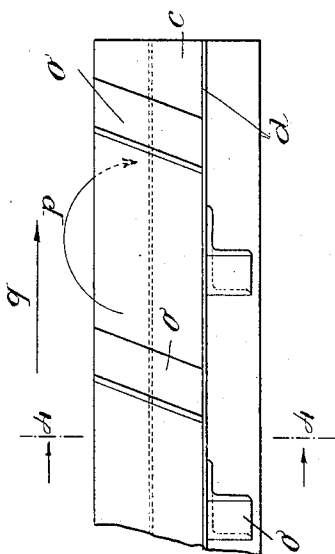


Fig 3



Witnesses
A. W. Meale Jr.
Geo. A. Bogue.

Inventor:
R. G. Poncet,
by
Watkinson & Fisher
Attorneys.

UNITED STATES PATENT OFFICE.

RENÉ GABRIEL PONCET, OF PARIS, FRANCE, ASSIGNOR TO SOCIÉTÉ D'ETUDES SPECIALES
ET D'INSTALLATIONS INDUSTRIELLES, OF PARIS, FRANCE.

ROTARY DRYING-MACHINE.

No. 868,475.

Specification of Letters Patent.

Patented Oct. 15, 1907.

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To all whom it may concern:

Be it known that I, RENÉ GABRIEL PONCET, a citizen of the Republic of France, residing at 33 Rue de la Sourdière, Paris, France, have invented new and useful Improvements in Rotary Drying-Machines, of which the following is a specification.

This invention has for object an improved rotary drying machine wherein a large drying surface is obtained with a machine of comparatively small compass. The accompanying drawing indicates diagrammatically and by way of example a construction of apparatus according to this invention.

Figure 1 shows the apparatus in vertical longitudinal section corresponding to the line 1—1 of Fig. 2, the group of elements being removed from the interior thereof for the sake of clearness. These elements are preferably tubular and constitute the active part of the drier. Fig. 2 is a transverse section corresponding to the line 2—2 of Fig. 1. Fig. 3 shows in elevation, on a larger scale than that of Figs. 1 and 2, part of a prismatic tubular element representing a modification. Fig. 4 is a transverse section corresponding to the line 4—4 of Fig. 3 looking from the left.

The apparatus comprises a cylinder *a*, the diameter and length of which are variable according to circumstances in different machines and are proportional to the amount of water to be evaporated. Under the action of any appropriate motive mechanism, not shown, the cylinder is caused to rotate horizontally upon four rollers *b* which support it.

Within the cylinder *a* is conveniently arranged a group of drying elements *c* which occupy that part of the cylinder indicated by the rectangle *v*, *x*, *y*, *z*, shown in dotted lines in Fig. 1. Each of these elements is preferably constituted by a prismatic tube the facets of which are prolonged all in the same direction to form wings which run nearly the whole length of the tube. The arrangement of these drying tubes with respect to each other is shown in Fig. 2 and the whole group of tubular drying elements is attached to the cylinder *a* and consequently rotates therewith. Although the drawings represent the elements *c* as consisting of tubes of square section, the invention is not limited to this structure and any other suitable form of element or support for the wings may be substituted.

In order to facilitate the advance of the product to be dried in the interior of the cylinder *a*, each tube *c* is preferably provided with means performing the function of a helix so that its wings *d* act as a sort of screw of a pitch appropriate to the kind of drying to be effected, as will more fully appear below. This arrangement, however, is not essential and an analogous result might be obtained in other ways. Within the cylinder *a* a certain number of flat blades *e* are arranged longitudinally for raising the product to be dried, which material, as the cylinder *a* revolves, falls down again in a

cascade, from drying element to element and naturally tends to collect again at the lower part of the cylinder.

A fire grate or other appropriate source of heat indicated diagrammatically at *f* in Fig. 1 furnishes the hot air required for desiccation by the pipe *g*. This air flows throughout the whole cross section of the cylinder *a* and circulates therethrough under the action of a fan, not shown, but which may be arranged to draw the air through the conduit *n* and the trunk *m*.

h denotes the charging hopper of the apparatus and *i* a number of chutes arranged around the periphery of the cylinder *a* with which they revolve. These chutes cooperate with the hopper *h* as the cylinder revolves and receive the material from the hopper and deliver it into the drier. The dried product escapes at the other end of the apparatus, by a door *j* to which it is led by an inclined platform *k*.

The operation is as follows: Presuming that the cylinder *a* is revolving and that the fan is drawing hot air into the cylinder *a* at *u*, *u*, the material to be dried is charged into the hopper *h* and is delivered successively by the chutes *i* into the cylinder *a* where, raised by the flat blades *e*, it falls down again at a certain moment onto the neighboring tubes *c*, *d*, and is thus distributed. As the cylinder *a* continues to revolve it is easy to understand that the tubes *c* will discharge the product to be dried from one to the other and that in a very short time their faces *d* will be covered with it. As however, these faces are inclined as will appear below, the product to be dried slides, while at the same time it falls from one tube or element to the other, and little by little, it advances towards the outlet end of the cylinder *a*. It will be readily conceived that the product to be dried is divided by the group of tubes *c* and consequently presents by the tubes very considerable surface and very thin layers, to the desiccating action of the hot air thereby favoring vigorous and rapid drying.

With a horizontal cylinder it is possible for the purpose of effecting the advance of the material to be dried, to adopt the arrangement represented in Figs. 3 and 4. In this arrangement, each element of the group consists of a rectilinear prismatic tube *c* the facets of which are, as in the arrangement hereinbefore described, prolonged all in the same direction so as to form rectilinear wings *d* running along the whole length of the tube. Upon each of the faces of the tubes *c* are then riveted at intervals inclined angle irons *o* having the effect of a spiral in transporting the material to be dried from one end of the cylinder to the other. These angle irons are arranged in such a way that the material which falls from one element of the group onto the neighboring element will be directed obliquely for the purpose of effecting the advance of this material in the desired direction, from which it can be readily seen how, supposing that the cylinder *a* of the drier revolves in the direction indicated by the arrows *p*, the material

to be dried will be directed or guided as it is discharged from element to element so as to advance in the direction of the arrows *q* (Figs. 1 and 3).

It is obvious that in this modification the elements *c* could have substantially no bore, as has been stated with respect to the arrangement first described, and still be provided with directing or guiding angle irons such as *o*.

I claim:

- 10 1. A rotary drying machine having in combination with a revolving cylinder at one end of which the material to be dried is introduced and into which a current of air is passed; a group of drying elements provided with longitudinal wings, fastened at the inside of this cylinder, revolving with the same, and arranged in such a manner as to discharge the material to be treated from one element to the other as the cylinder revolves, substantially as described.
- 20 2. In a drying machine of the kind set forth in combination with a horizontal cylinder, means for revolving said cylinder, means for introducing the material at one end of the cylinder and means for passing a current of air into the same; a group of drying elements fastened at the inside of the cylinder and revolving with the same, each element having its facets prolonged in the same direction towards the outside so as to form longitudinal wings on the same, substantially as described.
- 30 3. In a drying machine of the kind set forth, in combination with a horizontal cylinder, means for revolving this cylinder, means for introducing the material at one end of the cylinder and means for passing a current of air into said cylinder; a group of drying elements fastened at the inside of the cylinder and revolving with the same, each element having its facets prolonged in the same direction towards the outside so as to form longitudinal wings on the said element, and flat blades arranged longitudinally on the inside of the horizontal cylinder for the purpose of raising the product to be dried as the cylinder revolves, substantially as described.
- 40 4. In a drying machine of the kind described, in combination with a horizontal cylinder, means for revolving the cylinder, means for introducing the material at one end of the cylinder and means for passing a current of air into said cylinder, a group of drying elements, provided with facets and fastened to the inside of the cylinder and revolving with the same, each element having its facets prolonged in the same direction towards the outside so as to form longitudinal wings on the same, inclined angle irons fastened at intervals in the faces of each element and arranged so as to direct the material obliquely and cause its advance towards the other end of the drying machine, and flat blades arranged longitudinally on the inside of the
- 50

horizontal cylinder in order to raise the material to be dried as the cylinder revolves, substantially as described.

5. In a drying machine of the kind set forth, in combination with a horizontal cylinder, means for revolving this cylinder, means for introducing the material at one end of the cylinder and means for passing a current of air into said cylinder, a group of drying elements each of which consists of a prismatic element provided with a number of longitudinal wings extending from the said element and also provided with means for advancing the material to be dried along said axis, substantially as described and for the purposes set forth.

6. In a drying machine of the kind set forth, in combination with a horizontal cylinder, means for revolving the cylinder, means for introducing the material at one end of the cylinder and means for passing a current of air into said cylinder, a group of drying elements, each of which consists of a prism provided with a number of longitudinal wings extending from the body of the element, and also provided with means for advancing the material to be dried along said axis and having the effect of a spiral, and flat blades arranged longitudinally inside of the horizontal cylinder in order to raise the material to be dried as the cylinder revolves, substantially as described.

7. In a drying machine of the kind set forth, in combination with a horizontal cylinder, means for revolving the cylinder, means for introducing the material at one end of the cylinder, means for passing a current of air into said cylinder, a group of drying elements each of which consists of a prism provided with a number of longitudinal wings extending from the body of the element, inclined angle irons fastened at intervals on each of said wings and so arranged as to direct the material obliquely and thus have the effect of a spiral and cause it to advance to the other end of the drying machine, and flat blades arranged longitudinally inside the horizontal cylinder, adapted to raise the material to be dried as the cylinder rotates, substantially as described.

8. In a drying machine of the kind set forth, in combination with a cylinder, means for revolving said cylinder around its longitudinal axis, means for introducing the material at one end of the cylinder and means for passing a current of air into said cylinder, a group of rectilinear drying elements revolving with the cylinder arranged longitudinally inside the cylinder and adapted to discharge the material to be dried on one another as the cylinder revolves, and means on said elements for directing the material obliquely and thereby have the effect of a spiral transporting the material from one end of the cylinder to the other, substantially as described.

RENÉ GABRIEL PONCET.

Witnesses:

LOUIS RINNY,
HERNANDO DE SOTO.