

No. 622,431.

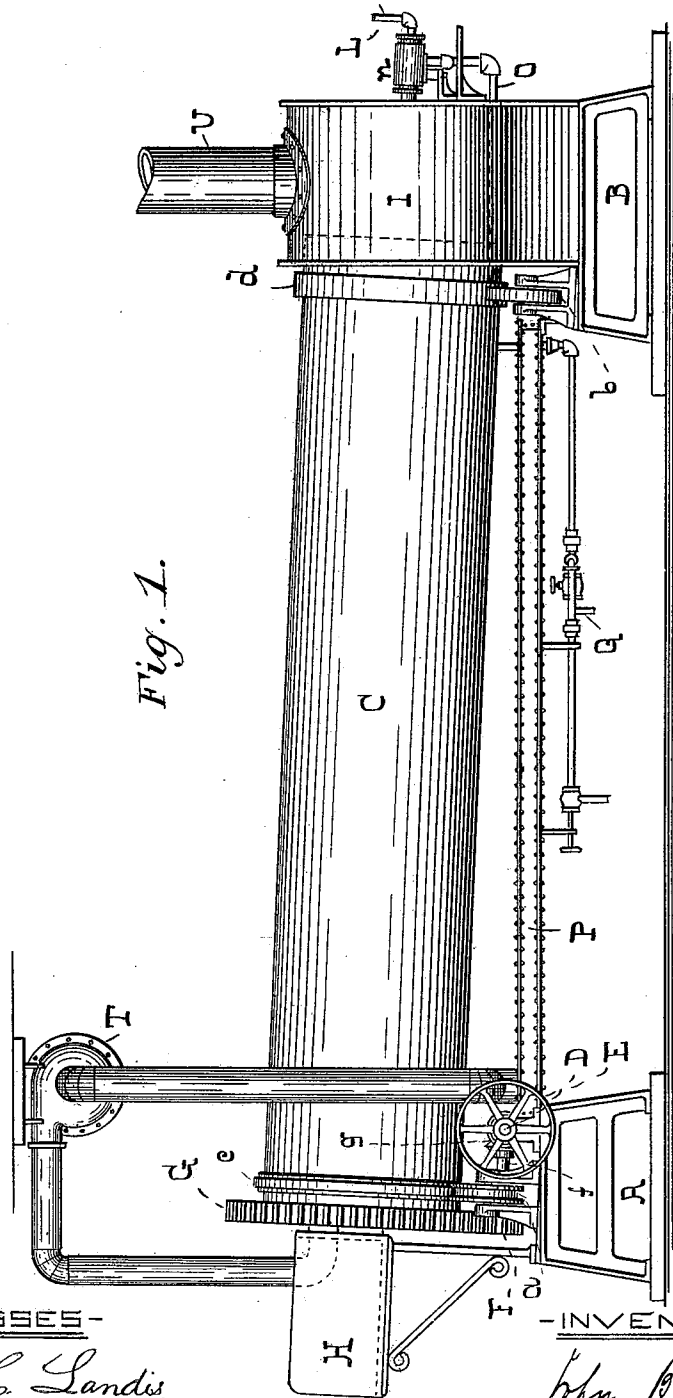
Patented Apr. 4, 1899.

J. B. ADT.
DRYING APPARATUS.

(Application filed Jan. 17, 1899.)

(No Model.)

3 Sheets—Sheet 1.



-WITNESSES-

Henry C. Landis,
Allen B. Howard.

-INVENTOR-

John B. Adt.
By Allen B. Howard
att'y

No. 622,431.

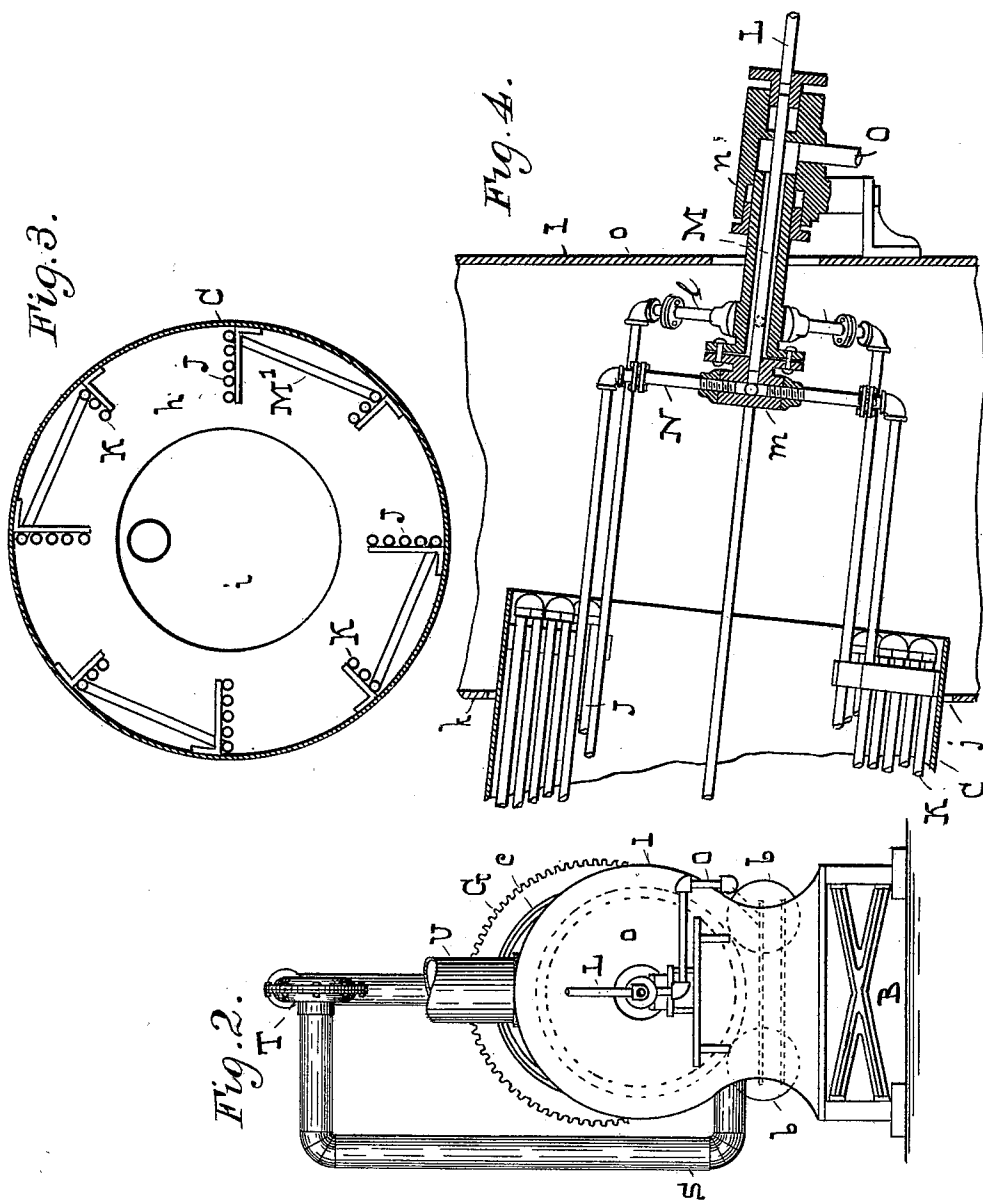
Patented Apr. 4, 1899.

J. B. ADT.
DRYING APPARATUS.

(Application filed Jan. 17, 1899.)

(No Model.)

3 Sheets—Sheet 2.



-WITNESSES-

Dan'l Fisher,
Allen B. Howard.

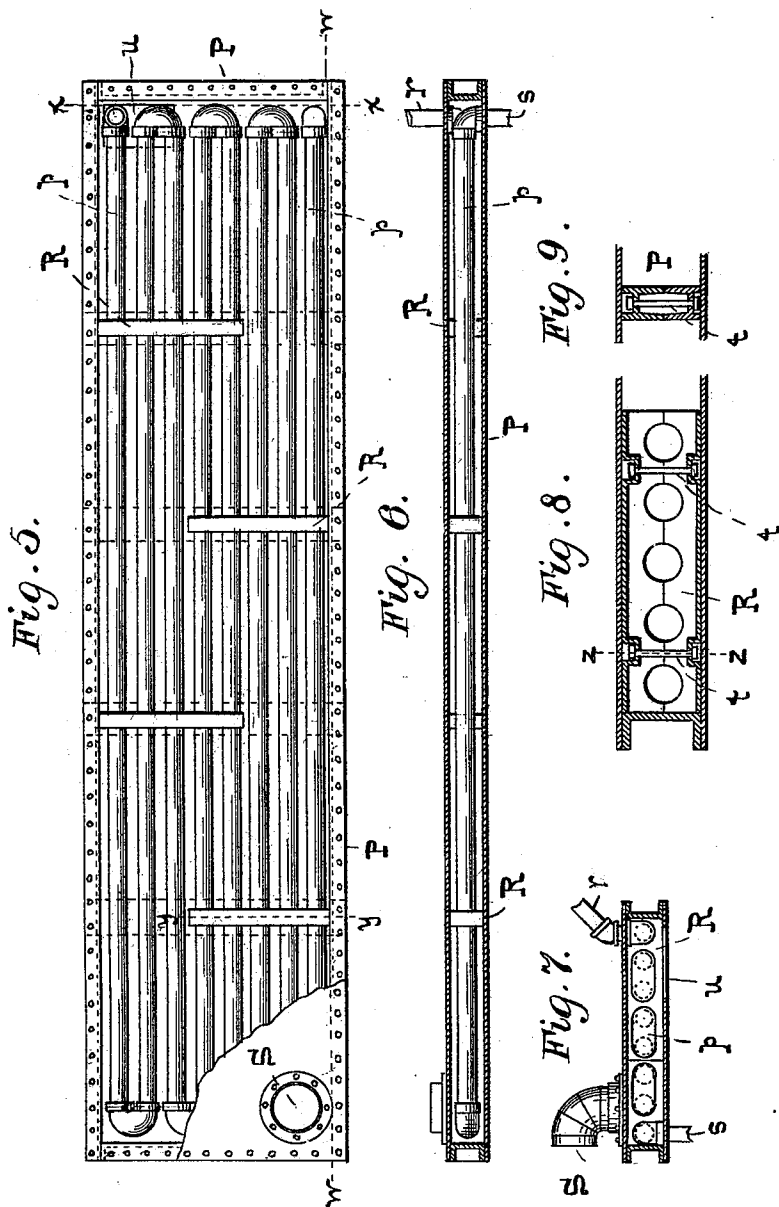
-INVENTOR-

John B. Act.
by Wm. W. Howard
att'y.

J. B. ADT.
 DRYING APPARATUS.
 (Application filed Jan. 17, 1899.)

(No Model.)

3 Sheets—Sheet 3.



-WITNESSES-

Don't Fisher
 Allen B. Howard.

-INVENTOR-

John B. Adt
 by Wm. H. T. Howard
 atty

UNITED STATES PATENT OFFICE.

JOHN B. ADT, OF BALTIMORE, MARYLAND.

DRYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 622,431, dated April 4, 1899.

Application filed January 17, 1899. Serial No. 702,390. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. ADT, of the city of Baltimore and State of Maryland, have invented certain Improvements in Drying Apparatus, of which the following is a specification.

This invention relates to an improved apparatus for drying tobacco and other materials; and it consists in the combinations set forth in the claims.

In the description of the said invention which follows reference is made to the accompanying drawings, forming a part hereof, in which—

Figure 1 is an exterior side view of the improved drying apparatus. Fig. 2 is an exterior end view. Fig. 3 is an enlarged cross-section of a rotary drum or cylinder forming a part of the apparatus. Fig. 4 is an enlarged longitudinal section of the delivery end of the cylinder together with certain of its connections. Fig. 5 is a partly sectional top view of an air-heating chamber constituting a part of the improved apparatus. Fig. 6 is a section of Fig. 5 taken on the dotted line *ww*. Fig. 7 is a section of Fig. 5 taken on the dotted line *xx*. Fig. 8 is an enlarged section of Fig. 5 taken on the dotted line *yy*. Fig. 9 is a section of Fig. 8 taken on the dotted line *zz*. Referring now to the drawings, A and B are the frames or stands of the apparatus, the former being at the feed and the latter at the delivery end of the same.

C is a rotary cylinder or drum supported in an inclined position by the two sets of rollers *a* and *b*, the cylinder having bands *c* and *d* wherein contact with the rollers. The rollers *a* are grooved, and the band *c* is adapted to fit in the grooves in order that the cylinder will not have any endwise movement. The rollers *b* and their band *d* have plain faces, as the said rollers merely support the delivery end of the cylinder. The cylinder is rotated from the driving-shaft D, provided with the driving-pulley E, through the medium of the counter-shaft *f*, the miter gear-wheels *g*, the pinion F at the end of the counter-shaft *f*, and the circular rack G, which is secured to the feed end of the cylinder. The cylinder-head *h* at the feed end of the apparatus has a central hole *i*, (see Fig. 3,) through which the materials to

be dried are introduced from a hopper or table H. (See Fig. 1.)

I is a stationary box (see Figs. 1, 2, and 4) supported by the frame B, having a circular opening *j* in its rear wall *k*, through which the delivery end of the rotary cylinder enters.

J and K are gangs of steam-pipe (see particularly Fig. 3) secured in the cylinder C to heat the materials passing through the cylinder, and they also serve to agitate the said materials by raising them and letting them fall in the rotation of the cylinder, as is common in apparatus of this class.

Live steam is introduced into the gangs J through the main steam-pipe L, its revoluble extension M, and the radially-placed branch pipes N, which are screwed into a central hub *m*, a portion of which rotates in the stationary packing-box *n*, secured to the front head *o* of the box I. The steam is returned through the gangs K, connected to the ones J by the transfer-pipes M', and passed by way of the radial pipes *l*, the space around the pipe M, and the pipe O to an air-heating chamber P, hereinafter described, and thence to a steam-trap Q, (shown in Fig. 1,) which allows only the escape of water of condensation. This steam-trap is of ordinary description.

The air-heating chamber P before referred to is situated below the cylinder C, and its construction is best illustrated in Figs. 5, 7, 8, and 9. It consists of a rectangular box containing a gang *p* of steam-pipe, the entrance end *r* of which is united with the pipe O. The delivery end *s* of this gang leads to the steam-trap Q.

R R are partition-plates extending a certain distance alternately from opposite sides of the box P, so as to form a circuitous route for air which is drawn through the box, as hereinafter described. For the sake of convenience in placing the gang-pipe and the partition-plates R in the box the said partitions are made in two parts or sections held together by bolts *t*, as shown particularly in Figs. 8 and 9. Cold air is drawn into the box P from the under side through the aperture *u* (shown only in Figs. 5 and 7) and traverses the same by a circuitous course until it reaches the pipe S, leading it to the exhaust-fan T, which delivers it to the interior

of the rotary cylinder C through the opening *i* in the head *h*.

The heated air forced through the cylinder C escapes by means of the vertical pipe U.

5 The cold air coming in contact with the gang *g* of steam-pipe in the box P is heated, and the condensation of steam effected thereby so reduces the pressure in the said gang that the flow of condensed steam in the gangs
10 J and K of the cylinder C is considerably accelerated and results in a better drainage of the said gangs than if the chief condensation took place in them, as would be the case if the cold air were admitted directly to the cyl-
15 inder. In other words, nearly all the condensation of steam in the gangs of the cylinder is due to the transfer of heat from the steam to the materials while in process of drying, the air being heated before it enters the cyl-
20 inder.

The advantage of the enforced drainage described will be better understood when it is borne in mind that all the condensed steam in the gangs of pipe in the cylinder C has to
25 pass through the radial pipes *l* while their gangs are elevated above the horizontal line in the rotation of the cylinder.

Supposing the apparatus to be in operation, the materials to be dried are fed from the hop-
30 per or table H to the cylinder through the opening *i* and discharged to the box I, from the lower part of which they are taken away either by hand or by some suitable mechanical means. The air heated as described is
35 forced by the fan through the cylinder and carries off the moisture generated in the heating of the materials by contact with the heated

gangs of steam-pipe, by which they are agitated in their movement from the feed to the delivery end of the cylinder.

I claim as my invention—

1. In a drying apparatus, the combination of a rotary cylinder having therein gangs of steam-pipe, an air-chamber containing a gang of pipe which receives its supply of steam
45 from the delivery end of the gangs in the cylinder, and a fan arranged to draw air through the air-chamber and force it into and through the cylinder, substantially as specified.

2. In a drying apparatus, a rotative cylinder having therein gangs of steam-pipe, and an air-chamber situated below the said cylinder with a gang of steam-pipe which receives its supply from the discharge end of the gangs in the cylinder, and also with partitions which
55 extend a certain distance alternately from opposite sides of the chamber, combined with an air exhausting and forcing fan arranged to draw air through the said chamber and discharge it into the cylinder, substantially as
60 specified.

3. In a drying apparatus, a rotative cylinder having steam-pipes therein, combined with a chamber situated below the cylinder from which air is drawn and forced into the
65 cylinder, and steam-pipes situated within the said chamber which are fed by steam discharged from those in the cylinder, substantially as specified.

JOHN B. ADT.

Witnesses:

WM. T. HOWARD,
GEO. E. TAYLOR.