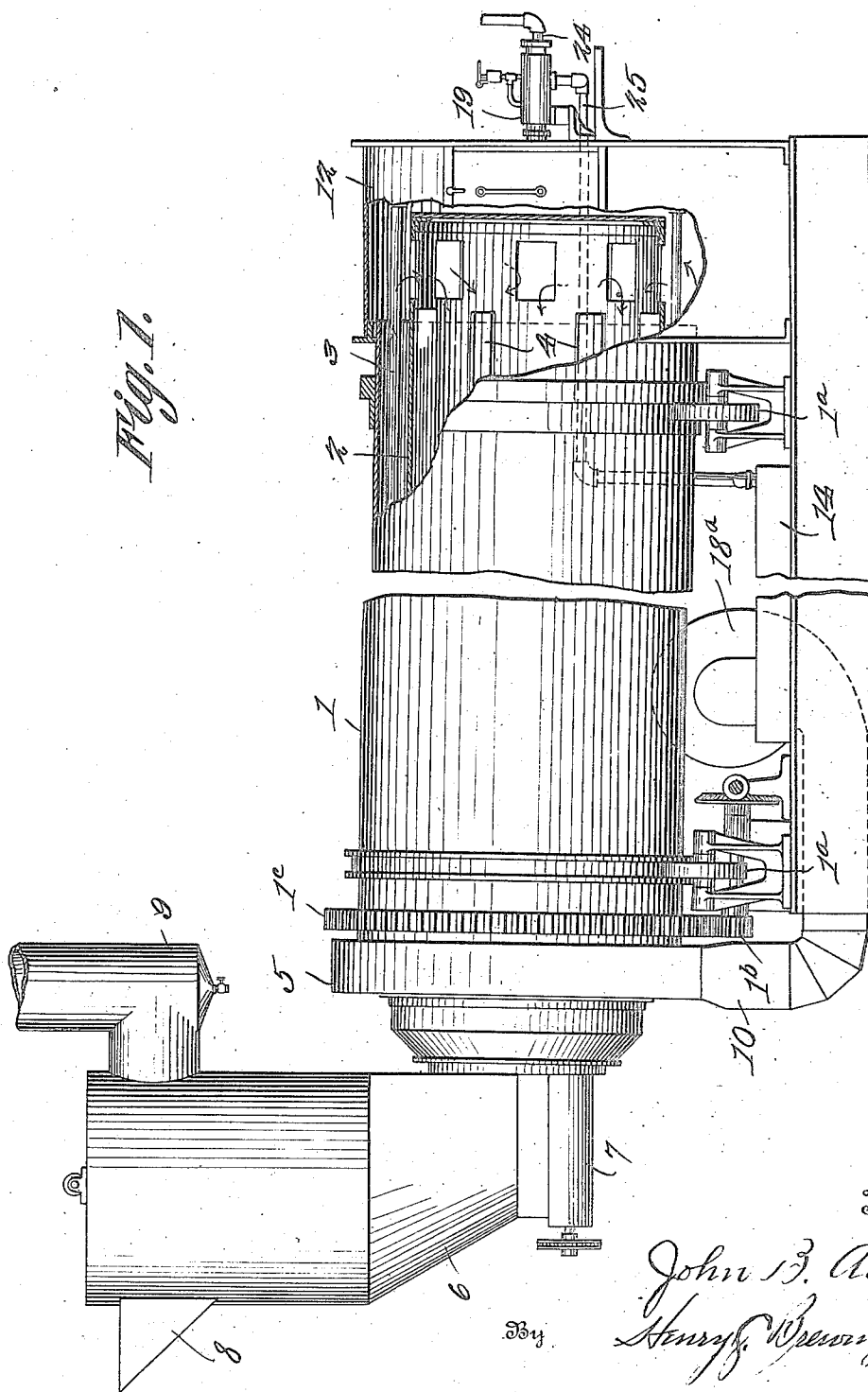


1,255,843.

J. B. ADT.
DRYING APPARATUS.
APPLICATION FILED JULY 17, 1917.

Patented Feb. 12, 1918.

6 SHEETS—SHEET 1.



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6 SHEETS—SHEET 2.

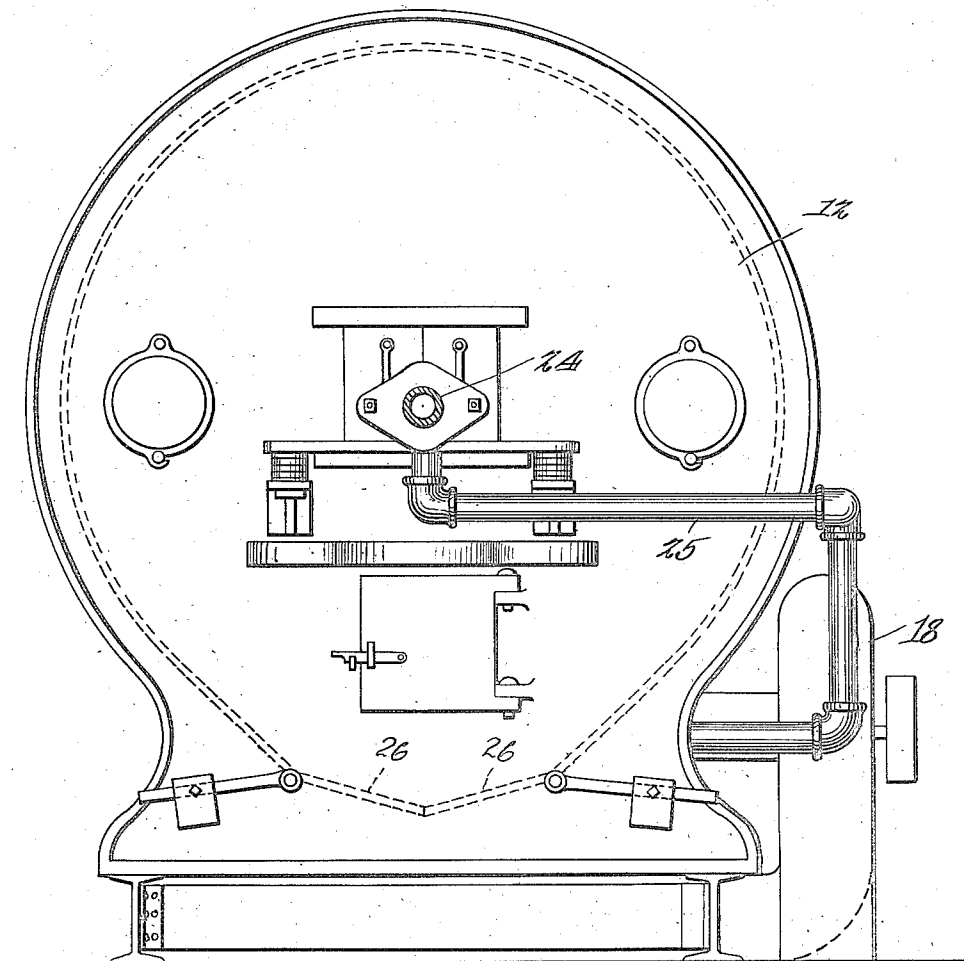


Fig. 2.

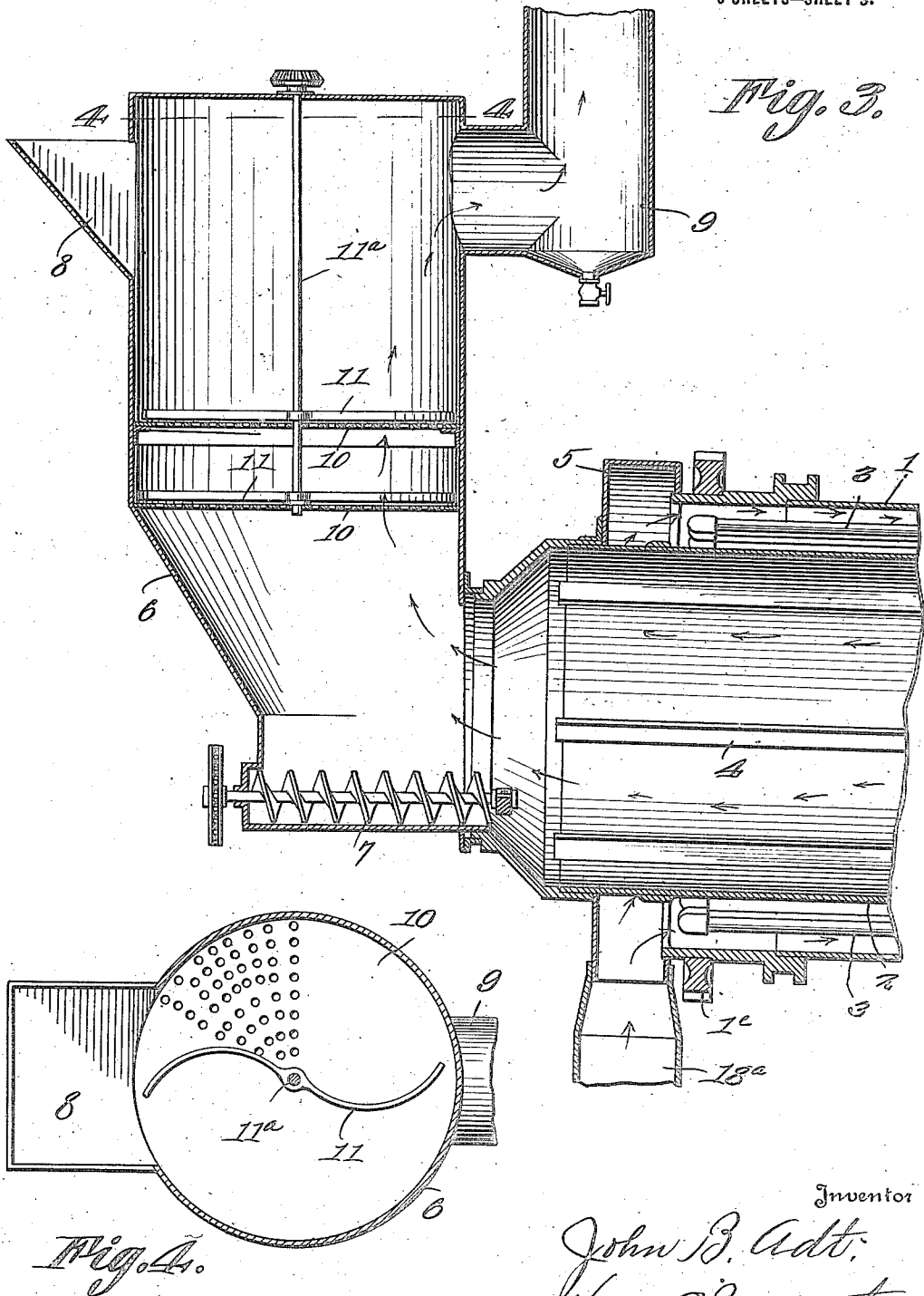
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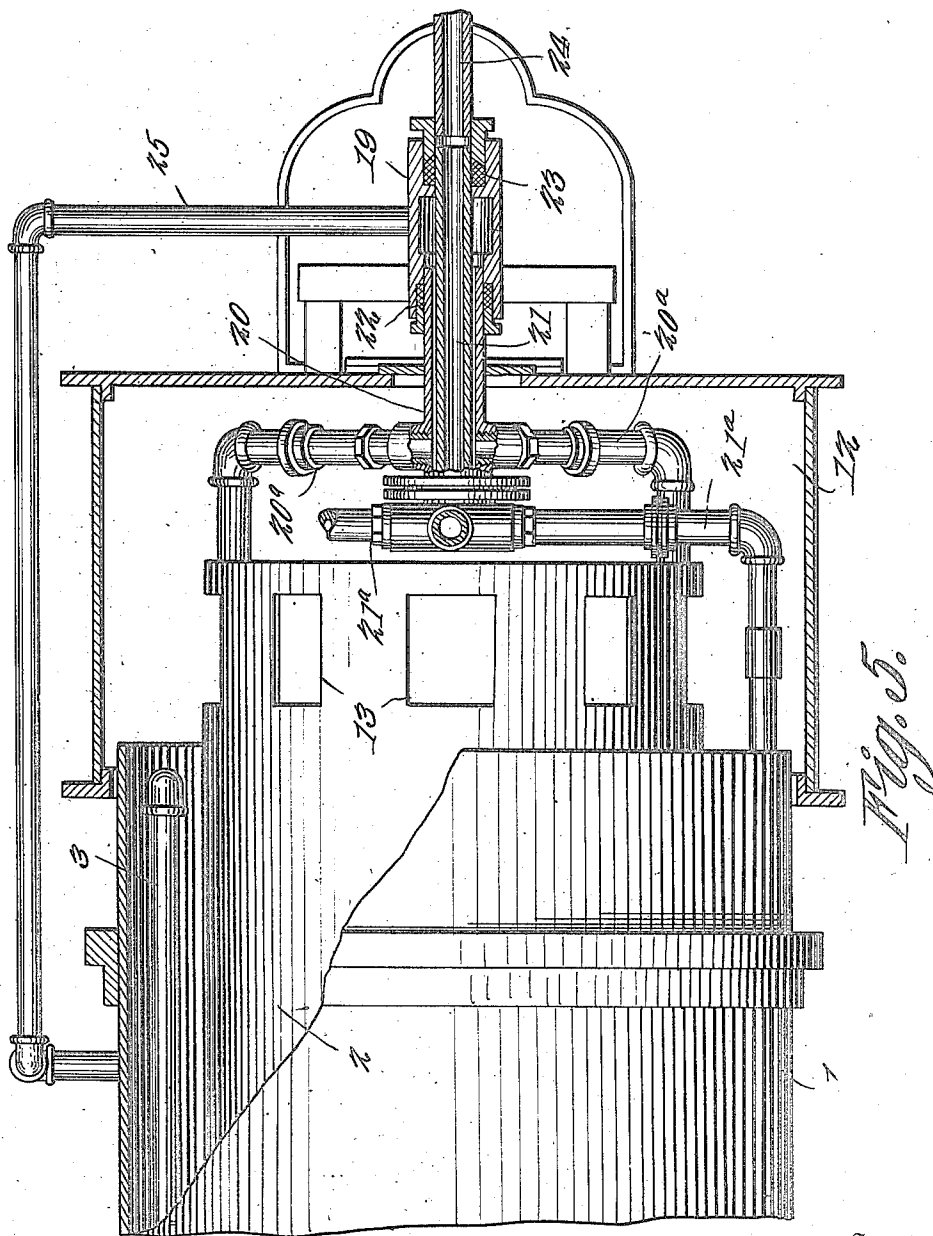


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Inventor

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By Henry J. Brewington

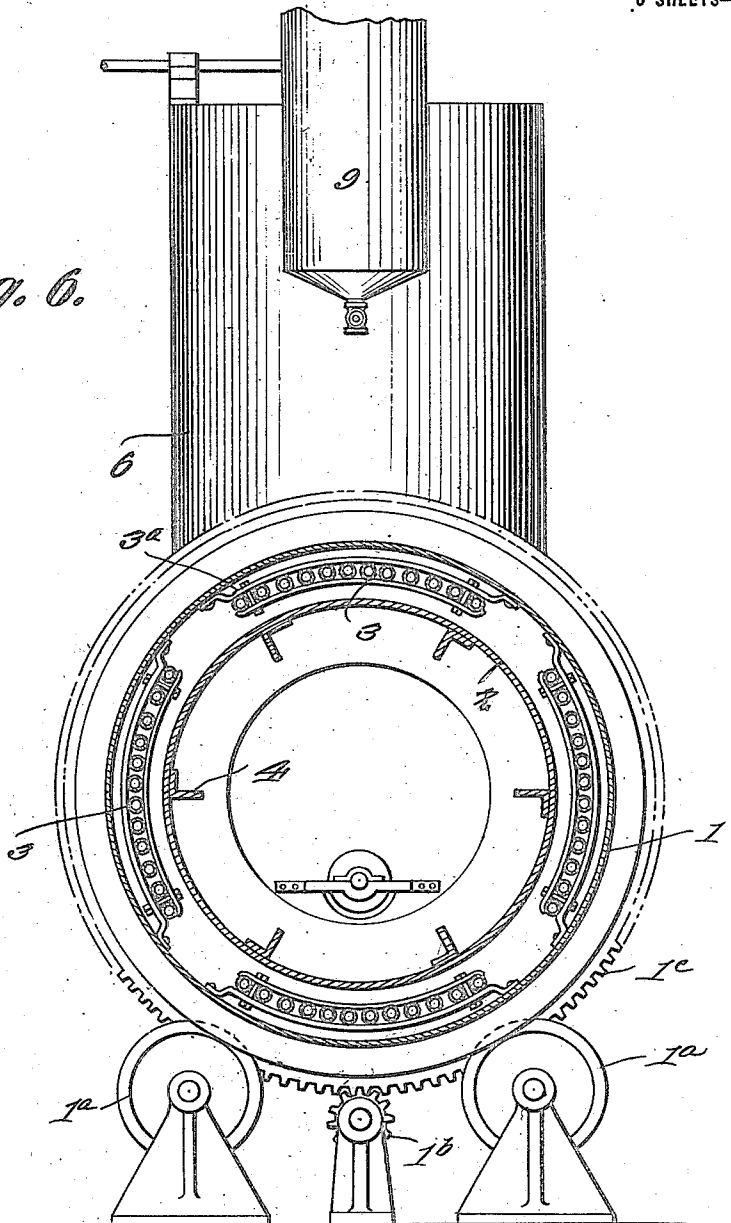
Attorney

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6 SHEETS—SHEET 5.

Fig. 6.



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 6 SHEETS—SHEET 6.

Fig. 7.

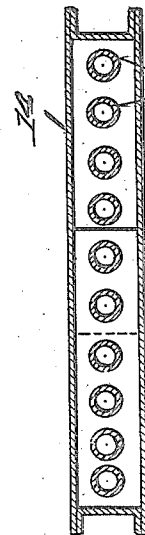
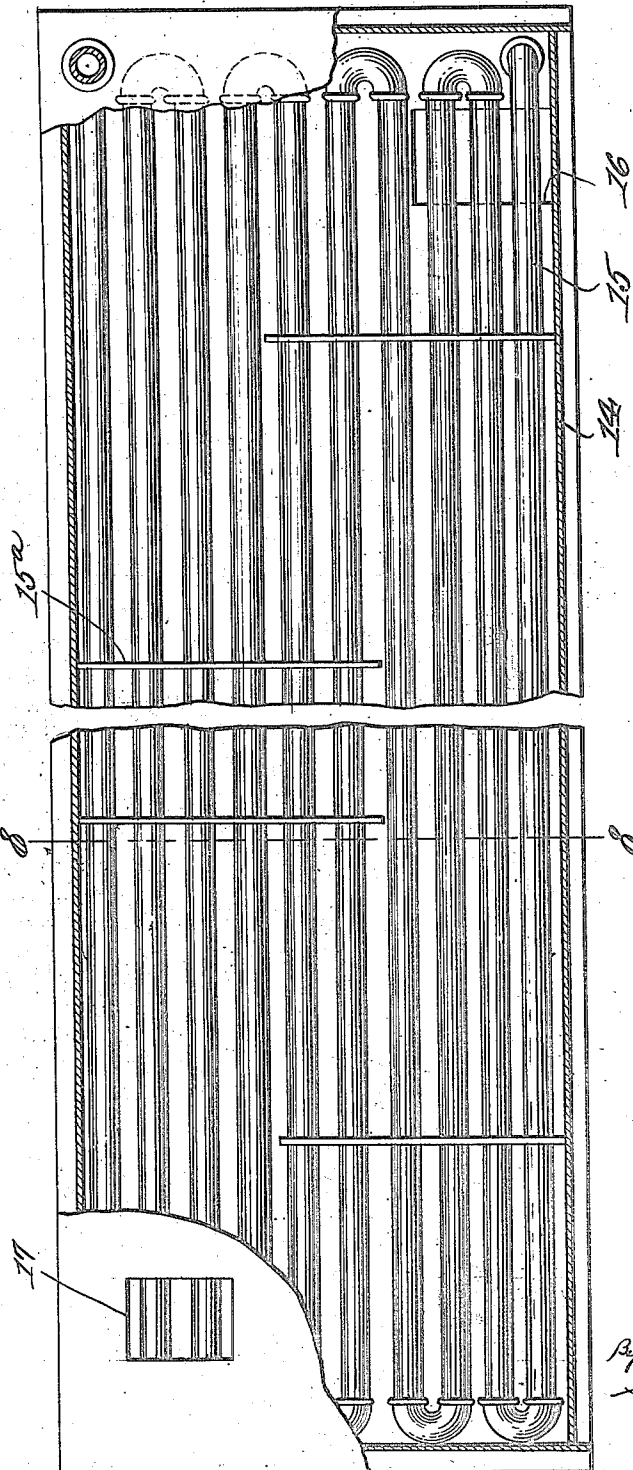


Fig. 8.

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UNITED STATES PATENT OFFICE.

JOHN B. ADT, OF BALTIMORE, MARYLAND.

DRYING APPARATUS.

1,255,843.

Specification of Letters Patent.

Patented Feb. 12, 1918.

Application filed July 17, 1917. Serial No. 180,985.

To all whom it may concern:

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

This invention relates to apparatus for drying starch, although it is not limited to such material but may, with equal facility, be employed for drying any other material.

The invention has reference more particularly to an apparatus of the type shown in the Patent No. 1057912, dated April 1, 1913, and its object is to generally improve said apparatus as will be pointed out in the detailed description appearing hereinafter.

In order that the invention may be better understood, reference is had to the accompanying drawings forming a part of this specification, and in said drawings—

Figure 1 is a side elevation of the apparatus, partly in section:

Fig. 2 is an end view thereof:

Fig. 3 is a sectional view of the receiving end of the apparatus;

Fig. 4 is a horizontal section on the line 4—4 of Fig. 3;

Fig. 5 is a sectional view of the discharging end of the apparatus;

Fig. 6 is a cross-section of the apparatus;

Fig. 7 is a plan view of an air heater, with parts of the casing broken away, and

Fig. 8 is a cross-section on the line 8—8 of Fig. 7.

Referring specifically to the drawings, 1 denotes a drum or cylinder supported for rotation about a horizontal axis on rollers 1^a, and driven by a pinion 1^b in mesh with a circular rack 1^c on the outside of the drum.

In the drum 1 is located concentrically, and in spaced relation therewith, a second drum 2. The space between the two drums forms a jacket containing coils of heating pipes 3, a plurality of banks of coils being provided, and said banks being mounted rigidly on the inside of the drum by suitable brackets 3^a. The material to be dried is fed through the drum 2, and in order to agitate and stir the same, the drum is armed with blades or paddles 4 mounted on its wall and extending inward.

The drum 1 terminates short of the inlet end of the drum 2 and it is here connected to a header 5, said header being stationary, and the end of the drum 1 therefore extending loosely thereinto so that it is free to ro-

tate, it being understood that said drum is fixed to the drum 2, both of said drums rotating as one.

The inlet end of the drum 2 is open and extends into a feed hopper 6, in the bottom of which is a screw conveyor 7 for feeding the material into the drum. The hopper has a side inlet 8, and opposite the same is a flue 9 leading from the hopper. In the hopper are located two vertically spaced screens 10 above which work stirrers 11 carried by a shaft 11^a obtaining power from any suitable source.

The outlet end of the drum 2 extends into an air expansion chamber 12, into which the drum 1 also extends so as to open thereinto. This end of the drum 2 is closed, but has side air inlets 13 through which air is admitted into said drum from the chamber 12.

Beneath the two drums 1 and 2 is located an air heater, the same comprising a casing 14 containing a coil of heating pipes 15 and also baffle plates 15^a to direct the air through the casing in a circuitous path. In the bottom of the casing, at one end thereof, is an air inlet 16, and at the other end is a top air outlet 17.

To the air outlet 17 of the heater casing 14 is connected the suction end of a blower 18 which discharges by a conduit 18^a into the header 5 from which latter the air passes into the space between the drums 1 and 2, where it is further heated by the coils 3. The air passes along the jacket formed by the drum 1, toward the discharge end of the drum 2, and here it enters the chamber 12 and passes from the latter through the openings 13 into the drum 2 containing the material to be dried. The air enters the outlet end of the drum and flows forward through the same toward the inlet end, where it passes into the hopper 6 and escapes through the flue 9.

The heating medium for the coils 3 and 15 is steam, the connection with the steam supply being made as follows:

On the outside of the chamber 12 is located a cylindrical receptacle 19 from one end of which extends a pipe 20. This end of the receptacle is also entered by a pipe 21. The pipe 20 enters the receptacle 19 through a stuffing box 22 and the pipe 21 extends through said pipe in spaced relation therewith. The other end of the receptacle has a packing box 23 into which the pipe 21 extends. The packing box is also entered by a steam supply pipe 24 leading from a suitable source. The pipe 24 discharges into the

pipe 21, but the latter is shut off from the interior of the receptacle 19, the pipe 20 only being in communication therewith.

The pipe 21 has branches 21^a whereby it is connected to the coils 3, and the pipe 20 has branches 20^a which are also connected to said coils. The receptacle 19 is connected by a pipe 25 to the coils 15. Thus, it will be seen that the steam supplied by the pipe 24 flows into the pipe 21 and is delivered by the branches 21^a to the coils 3, and after circulating through the latter it flows through the branches 20^a to the pipe 20 and is discharged into the receptacle 19, from which latter it is delivered to the coils 15 through the pipe 25. From the coils 15 the steam is discharged into the atmosphere, through a steam trap if desired.

The material, upon reaching the discharge end of the drum 2 drops through openings 13 onto a floor in the chamber 12, said floor being composed of two tiltable sections 26 which can be dropped to dump the dried material.

The apparatus is designed more particularly for drying starch. The starch is fed into the hopper and percolates through the perforated plates, this brings the starch to the drying cylinder in fine particles instead of lumps and it is much easier to dry as such, also the moisture laden air from the drier carries small particles of fine starch along with it, and by the air passing through these perforations, and coming in contact with the wet material, assists in heating the incoming material and also precipitates the fine starch which is returned to the drier along with the wet material. The material entering the drum 2 is in a wet state. The drum is heated by coils 3, and heated air is also forced through the drum and the mass of material therein. The operation is substantially the same as in the apparatus disclosed in my Patent No. 1057912, dated April 1, 1913, the present apparatus being an improvement over the same. The drying operation is more thoroughly and economically effected, and as the material does not come in contact with the coils 3, the latter are not exposed to the material and subject to the latter sticking thereon and forming a hard baked covering to reduce their heat conductivity. Any particles of dried material taken up by the air are prevented by the screens 10 from escape to the flue 9, and they are thrown by the scrapers 11 back into the bottom of the hopper.

I claim:

1. In a drying apparatus, a rotary drum having a material inlet and an air outlet at one end and a material outlet at the opposite end, an air-expansion chamber into which the outlet end of the drum extends

and into which it opens, a heating jacket surrounding the drum and opening into the air-expansion chamber, said jacket being carried by the drum and rotatable therewith, an air heater, and means for delivering air from said heater into the aforesaid jacket.

2. In a drying apparatus, a rotary drum having a material inlet and an air outlet at one end and a material outlet at the opposite end, an air-expansion chamber into which the outlet end of the drum extends and into which it opens, a heating jacket surrounding the drum and opening at one end into the air-expansion chamber, said jacket being carried by the drum and rotatable therewith, a header with which the other end of the jacket communicates, an air heater, and means for delivering air from said heater into the header.

3. In a drying apparatus, a rotary drum having a material inlet and an air outlet at one end and a material outlet at the opposite end, an air-expansion chamber into which the outlet end of the drum extends and into which it opens, a heating jacket surrounding the drum and opening into the air-expansion chamber, an air heater, and means for delivering air from said heater into the aforesaid jacket, the air outlet of the drum having means for deflecting the material back into the material inlet of the drum.

4. In a drying apparatus, a rotary drum having a material outlet at one end, a charging hopper connected to the other end of the drum, and having an air outlet, a screen in the hopper between the air outlet thereof and the material inlet of the drum, an air-expansion chamber into which the outlet end of the drum extends and into which it opens, a heating jacket surrounding the drum and opening into the air-expansion chamber, an air heater, and means for delivering air from said heater into the aforesaid jacket.

5. In a drying apparatus, a rotary drum having a material inlet and an air outlet at one end and a material outlet at the opposite end, an air-expansion chamber into which the outlet end of the drum extends and into which it opens, a heating jacket surrounding the drum and opening into the air-expansion chamber, said jacket being carried by the drum and rotatable therewith, an air heater, and means for delivering air from said heater into the aforesaid jacket at the end thereof opposite the end which opens into the expansion chamber.

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN B. ADT.

Witnesses:

E. WALTON BREWINGTON,
HOWARD D. ADAMS.