J. C. MacLACHLAN.

DESICCATING APPARATUS.

APPLICATION FILED JULY 17, 1911.

1,038,773.

Patented Sept. 17, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

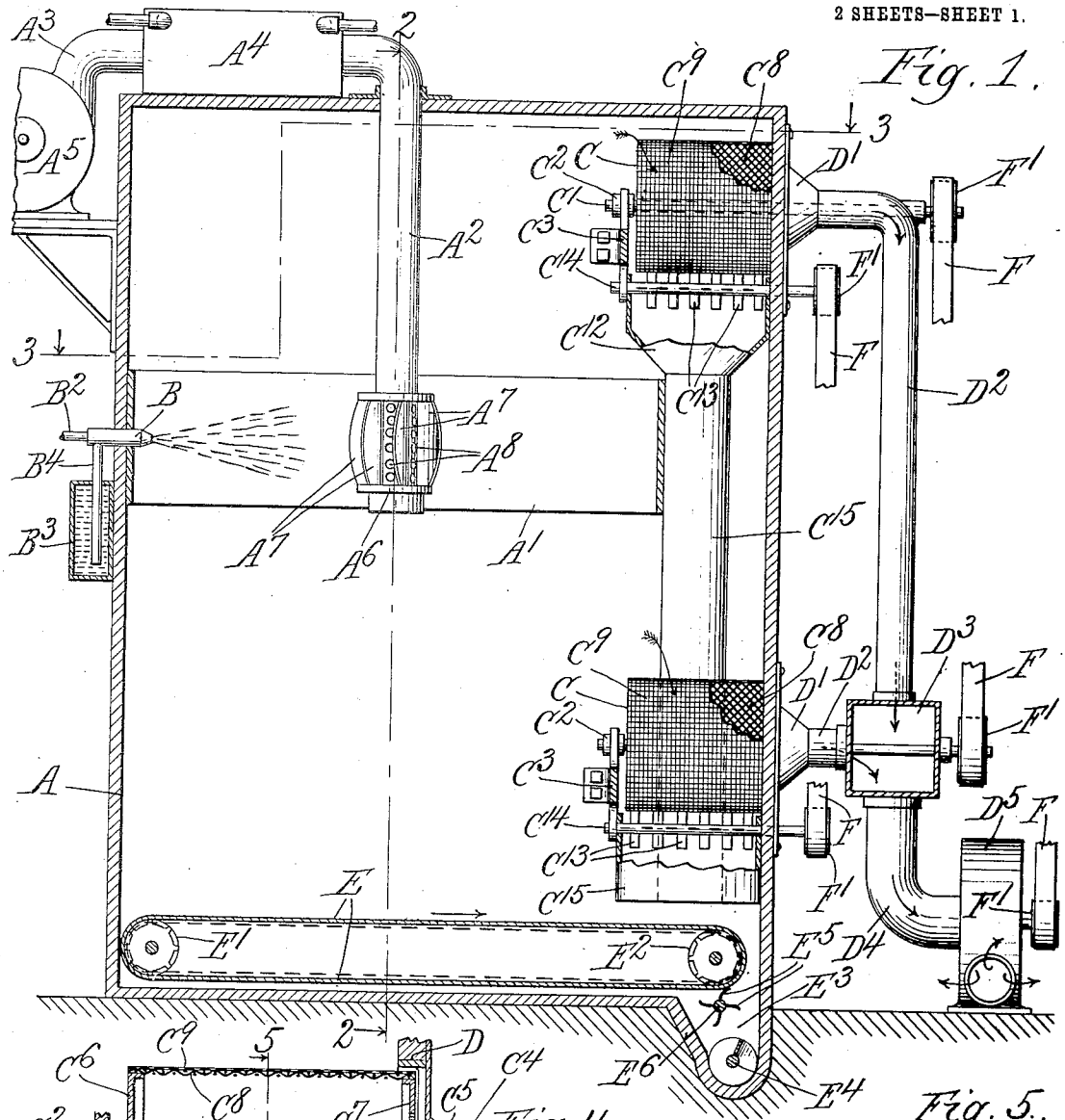


Fig. 4.

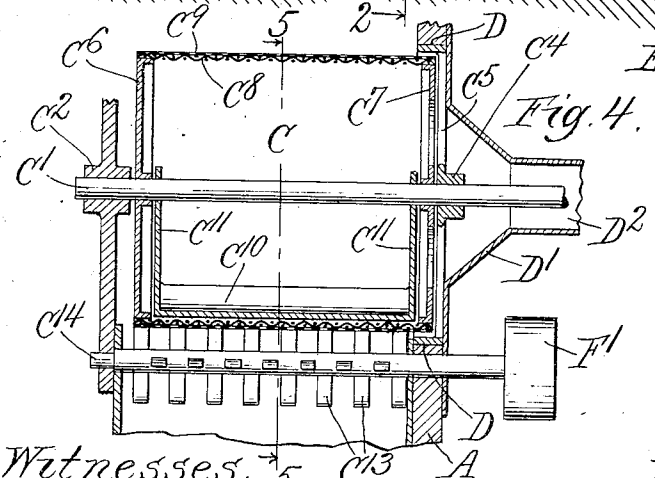
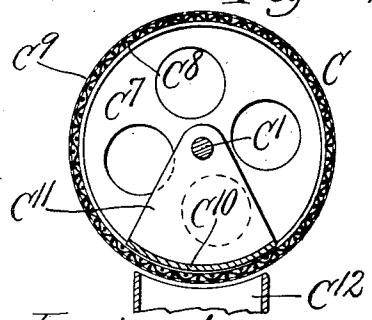


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 3

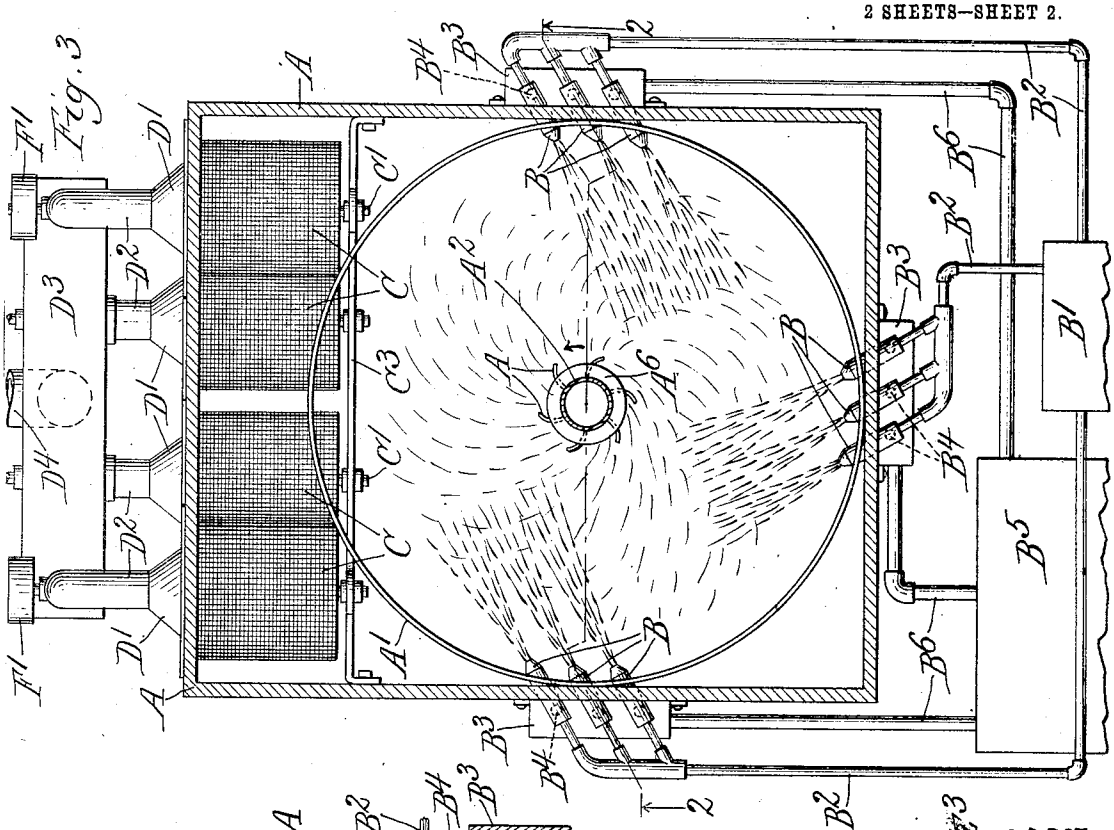
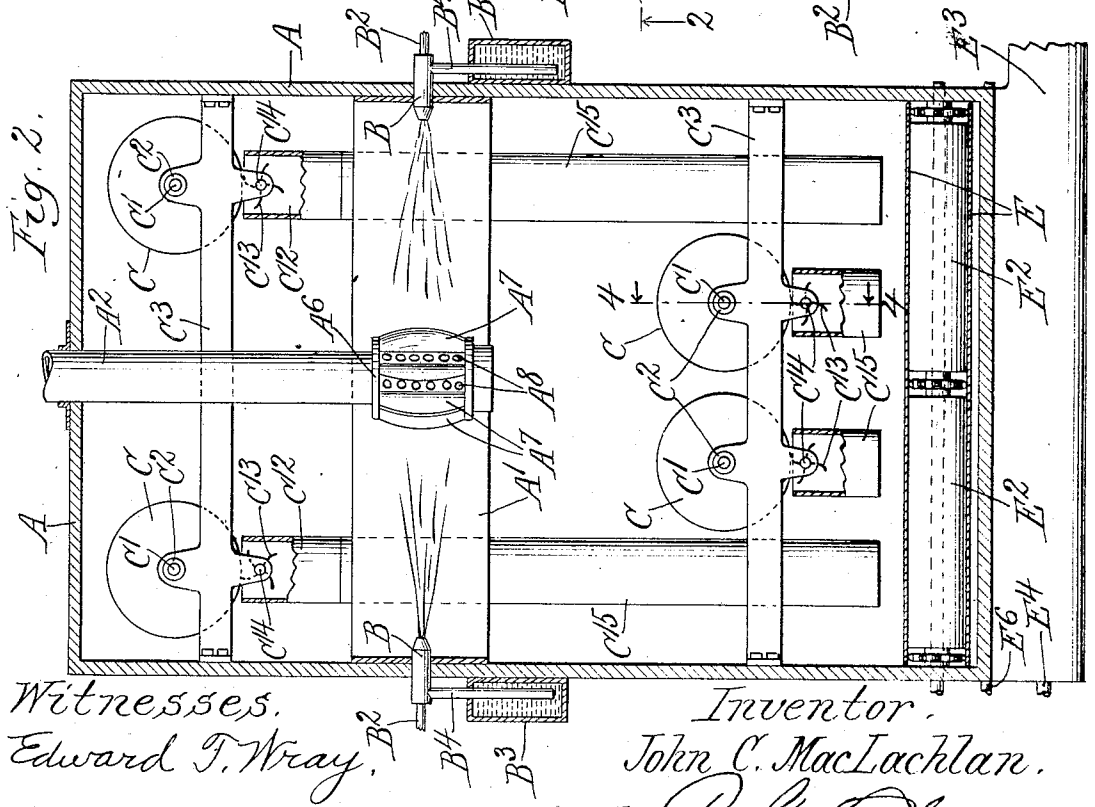


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN C. MacLACHLAN, OF CHICAGO, ILLINOIS.

DESICCATING APPARATUS.

1,038,773. Specification of Letters Patent. Patented Sept. 17, 1912.

Application filed July 17, 1911. Serial No. 638,828.

To all whom it may concern:

Be it known that I, JOHN C. MacLACHLAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Desiccating Apparatus, of which the following is a specification.

My invention relates to improvements in desiccating apparatus and is illustrated diagrammatically in one form in the accompanying drawing, wherein—

Figure 1 is a vertical section; Fig. 2, a section along the line 2—2 of Fig. 1; Fig. 3, a section along the line 3—3 of Fig. 1; Fig. 4, a section along the line 4—4 of Fig. 2; Fig. 5, a section along the line 5—5 of Fig. 4.

Like parts are indicated by like characters throughout the several figures.

The rectangular closed desiccating casing A contains the horizontally disposed cylindrical deflecting ring A^1 and is tangential to three sides thereof. The air supply pipe A^2 which is concentric with the ring A^1, projects downwardly from the top of the casing A, communicates at one end with the vertically disposed pipe A^3 leading through the heater A^4, shown diagrammatically, to the fan A^5 and at the other end terminates in the rotatable discharge head A^6 provided with the curved vanes A^7 in opposition to the discharge openings A^8.

The atomizer supply nozzles B which project in groups of three through the walls of the casing A and through the deflecting ring A^1 on the three sides of the casing where it is tangential to the ring and are inclined to the radii of the ring, are supplied with compressed air from the air compressor B^1 through the air pipe B^2 and is supplied with liquid from the receptacles B^3 through the perpendicular pipes B^4 at right angles to the nozzles. The receptacles B^3 are supplied from the reservoir B^5 through the supply pipe B^6.

The drums C are mounted upon the shafts C^1 which shafts are supported at one end in the bearings C^2 supported in the beams C^3 extending across the casing A and at the other end in the bearings C^4 supported by the spiders C^5 on the wall of the casing A. The drums C are made up of the closed end disk C^6 and the perforate end disk C^7 each rigidly mounted upon the shafts C^1 and carrying woven wire cylinders C^8 upon the outside of which are carried the cloth screens C^9. The anvils C^{10} are concentric with the cylinders C^8 and mounted rotatably upon the shafts C^1 by means of the lugs C^{11}. The funnels C^{12} which are in opposition at their upper extremities to the brushes or whips C^{13} on the shafts C^{14} terminate in the downwardly extending discharge pipe C^{15}.

The walls of the casing A is provided with the perforations D concentric with the drums C and in opposition to the perforate end disks. The funnels D^1 are in opposition to the perforations D and discharge through the pipes D^2 to the header D^3 from which leads the pipe D^4 to the exhaust fan D^5.

The conveyer belt E extends over substantially the entire bottom of the casing A and is mounted on the rolls E^1, E^2, the roll E^2 being located immediately above the pocket E^3 in which rotates the screw conveyer E^4, the brushing or whipping strips E^5 mounted upon the shaft E^6 rotate in opposition to the conveyer belt adjacent the roll E^2 and above the screw conveyer E^4.

The shafts C^1, C^{14} and E^6 together with the rolls E^1 and D^2 are all driven from any suitable source of power by any suitable connecting means such as belts F traveling over the pulleys F^1 as indicated.

It will be evident that while I have shown in my drawings an operative device, still many changes might be made in size, shape and arrangement of parts without departing from the spirit of my invention and I wish therefore, that my drawings be regarded as in a sense diagrammatic.

The use and operation of my invention are as follows: Cool air is forced by the fan through the heater and rotating discharge head into the desiccating chamber, the air currents being directed by the rotating head radially outward toward the deflecting ring in a horizontal direction. The liquid to be desiccated is blown into the desiccating chamber through the atomizer or supply nozzles, which discharge in a horizontal plane and are disposed about the periphery of the deflecting ring inclined to the radius in such manner as to tend to set up rotary currents in a direction opposite to those set up by the rotating air discharge head. Violent mixing and eddying of the currents which result cause a very complete commingling of the finely divided particles of the liquid with the heated particles of air, thus giving the heated air an opportunity to evaporate

the water from the liquid, thus desiccating and reducing it to dust. The rotary motion of the particles of liquid and of the air or gases within the desiccating chamber, which motion is controlled and guided by the deflecting ring will tend to hold the particles of liquid in suspension and prevent their too quick descent under the influence of gravity to the bottom of the chamber, thus giving the heated air an increased length of time in which to complete the desiccation thereof. The air which enters the chamber through the rotary discharge head and through the atomizer nozzles will leave it through the rotary discharge drums located adjacent the top and bottom of the desiccating chamber. The velocity of the air currents passing through the discharge drums will cause a considerable quantity of a desiccated product or powder to be deposited upon their surfaces as the air passes through the porous coverings. This deposit will be dislodged by the brushes or whips rotating against the surfaces of the drums and will drop down through the funnels and pipes to the conveyer belt in the bottom of the chamber. This belt will also catch those particles which drop by gravity out of the desiccating zone to the bottom of the chamber. The motion of the conveyer belt will cause the material on it to be constantly discharged into the screw conveyer pocket, whence it will be conveyed to any suitable storage receptacle not shown by the screw conveyer. Similar whips or brushes in opposition to the end of the conveyer belt and adjacent the screw conveyer operate to dislodge the powder or desiccated material from the belt. The suction fan which draws the air out of the header to which it is supplied by the air ducts leading from the discharge drums, has for its function to promote a free flow of air and prevent any backing up of the air in the desiccating chamber.

I have used the words "eddy currents" in the claims. I wish it understood that by this I mean currents traveling more or less radially in different directions as distinct from the case in which the general direction or flow is more or less constant or interrupted or in which the general direction of the flow varies gradually.

I claim:

1. A desiccator comprising a desiccating chamber, means for discharging liquid and gases thereto, together with means for inducing eddy currents in a horizontal plane therein.

2. A desiccator comprising a desiccating chamber, means for supplying heated gases thereto, a discharge head through which said gases pass, said head being located centrally within said chamber.

3. A desiccator comprising a desiccating chamber, means for supplying heated gases thereto, a rotary discharge head through which said gases pass, said head being located centrally within said chamber.

4. A desiccator comprising a desiccating chamber, means for supplying heated gases thereto, a discharge head through which said gases pass, said head being located centrally within said chamber and discharging in a horizontal plane.

5. A desiccator comprising a desiccating chamber, means for supplying heated gases thereto, a discharge head through which said gases pass, said head being located centrally within said chamber, means located adjacent the walls of said chamber for supplying liquid thereto.

6. A desiccator comprising a desiccating chamber, means for supplying heated gases thereto, a rotary discharge head through which said gases pass, said head being located centrally within said chamber, means located adjacent the walls of said chamber for supplying liquid thereto.

7. A desiccator comprising a desiccating chamber, means for supplying heated gases thereto, a discharge head through which said gases pass, said head being located centrally within said chamber and discharging in a horizontal plane, means located adjacent the walls of said chamber for supplying liquid thereto.

8. A desiccator comprising a desiccating chamber, means for supplying heated gases thereto, a discharge head through which said gases pass, said head being located centrally within said chamber, means located adjacent the walls of said chamber for supplying liquid thereto, said means comprising atomizing nozzles.

9. A desiccator comprising a desiccating chamber, means for supplying heated gases thereto, a rotary discharge head through which said gases pass, said head being located centrally within said chamber, means located adjacent the walls of said chamber for supplying liquid thereto, said means comprising atomizing nozzles.

10. A desiccator comprising a desiccating chamber, means for supplying heated gases thereto, a discharge head through which said gases pass, said head being located centrally within said chamber and discharging in a horizontal plane, means located adjacent the walls of said chamber for supplying liquid thereto.

11. A desiccator comprising a rectangular desiccating chamber, a cylindrical deflecting ring therein and means for supplying gases and liquids thereto in a horizontal plane intersecting said ring.

12. A desiccator comprising a rectangular desiccating chamber, a cylindrical horizontally disposed deflecting ring therein and means for supplying gases and liquids

thereto in a horizontal plane intersecting said ring.

13. A desiccator comprising a rectangular desiccating chamber, a cylindrical deflecting ring therein and means for supplying gases and liquids thereto, said gas supply means located at the center of said ring.

14. A desiccator comprising a rectangular desiccating chamber, a cylindrical horizontally disposed deflecting ring therein and means for supplying gases and liquids thereto in a horizontal plane intersecting said ring, said gas supply means located at the center of said ring.

15. A desiccator comprising a rectangular desiccating chamber, a cylindrical deflecting ring therein and means for supplying gases and liquids thereto in a horizontal plane intersecting said ring, said liquid supply means located peripherally about said ring.

16. A desiccator comprising a rectangular desiccating chamber, a cylindrical horizontally disposed deflecting ring therein and means for supplying gases and liquids thereto in a horizontal plane intersecting said ring, said liquid supply means located peripherally about said ring.

17. A desiccator comprising a rectangular desiccating chamber, a cylindrical deflecting ring therein and means for supplying gases and liquids thereto in a horizontal plane intersecting said ring, said gas supply means located at the center of said ring.

18. A desiccator comprising a rectangular desiccating chamber, a cylindrical horizontally disposed deflecting ring therein and means for, supplying gases and liquids thereto in a horizontal plane intersecting said rings, said liquid supply means located peripherally about said ring, said gas supply means located at the center of said ring.

19. A desiccator comprising a desiccating chamber, means for supplying liquids and gases thereto and means for withdrawing the air therefrom, said means comprising a plurality of rotary drums having porous walls and means for dislodging solid particles from said walls.

20. A desiccator comprising a flat walled desiccating chamber, means for introducing heated gases and liquids thereto and means for causing said liquids and gases to rotate about a vertical axis in opposite directions.

21. A desiccator comprising a flat walled desiccating chamber, means for introducing heated gases and liquids thereto and means for causing said liquids and said gases to rotate about a vertical axis in opposite directions, said means comprising inclined atomizing nozzles and a centrally disposed discharge head having rotary vanes thereto.

22. A desiccating apparatus comprising a desiccating chamber, means for discharging liquid to be desiccated thereinto, means for discharging heated gas thereinto and means for holding said liquid in suspension therein.

23. A desiccator comprising a rectangular chamber, a cylindrical deflecting ring horizontally disposed therein, means for discharging heated gas radially from the center thereof and means for discharging liquid in a direction inclined to the radius of the cylinder and in a horizontal plane which passes through said cylinder.

24. A desiccator comprising a desiccating chamber, means for supplying heated gas thereto, means for withdrawing gas therefrom, said withdrawing means comprising a plurality of drums, porous coverings therefor and means for removing deposits therefrom.

25. A desiccating apparatus comprising a chamber, means for introducing liquid and gas thereto and means for withdrawing gas therefrom, said means comprising a plurality of rotary porous drums closed at one end and means for withdrawing the gas from the interior of said drum.

26. A desiccating apparatus comprising a chamber, means for introducing liquid and gas thereto and means for withdrawing gas therefrom, said means comprising a plurality of rotary porous drums and beaters rotating in opposition to the periphery of said drums and means for withdrawing the gas from the interior of said drum.

27. A desiccating apparatus comprising a chamber means for introducing liquid and gas thereto and means for withdrawing gas therefrom, said means comprising a plurality of rotary porous drums, axles upon which said drums are mounted, anvil segments depending from said shafts and beaters rotating in opposition to said drums at the lowest point of their peripheries and in opposition to said anvils and means for withdrawing the gas from the interior of said drum.

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