

W. C. MITCHELL.
CENTRIFUGAL DRYING MACHINE.
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966,573.

Patented Aug. 9, 1910.

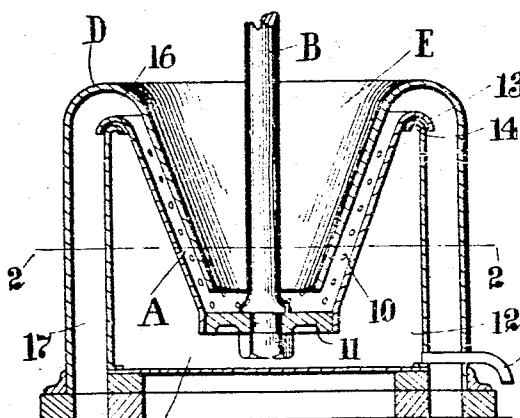


Fig. 1.

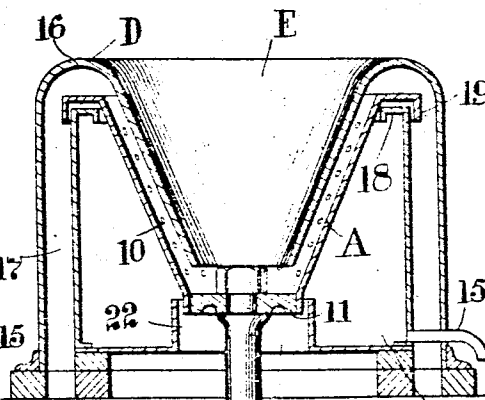


Fig. 2.

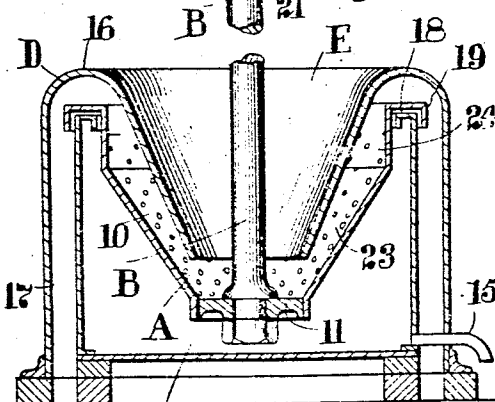
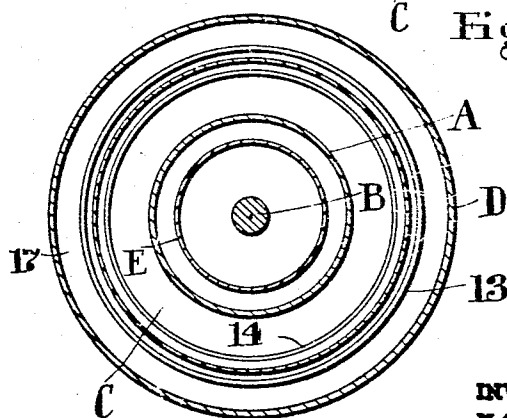


Fig. 3.

Fig. 4.



WITNESSES

J. H. Gray
Russell Smart

INVENTOR
W. C. MITCHELL.

BY *Lud B. Schuster*
ATTY.

UNITED STATES PATENT OFFICE.

WILLIAM CLARK MITCHELL, OF SYDNEY, NOVA SCOTIA, CANADA.

CENTRIFUGAL DRYING-MACHINE.

966,573.

Specification of Letters Patent.

Patented Aug. 9, 1910.

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To all whom it may concern:

Be it known that I, WILLIAM CLARK MITCHELL, of Sydney, in the Province of Nova Scotia, Canada, have invented certain
5 new and useful Improvements in Centrifugal Drying-Machines, of which the following is a specification.

My invention relates to improvements in centrifugal drying machines of the type in which moisture is extracted from material which is in a more or less finely divided state, such as coal, by means of centrifugal force, and the object of my invention is to enable the material to be fed continuously
15 through the machine while the same is rotating, the power for the feeding being the centrifugal force in rotating the machine, this result being achieved in a simple and practicable manner.

In its construction, the invention includes a rotary conical receptacle having an inclined and perforated wall, in combination with a tank for receiving the water passing through the receptacle, and a rigid casing inclosing the tank, the inner wall of said casing being adapted to guide the material which flows over the upper or outer end of the receptacle owing to the upward movement imparted by the inclined walls when the receptacle is rotated. The upper or
30 outer end of the receptacle is outwardly turned, curved or flanged to fit over the inwardly turned, curved or flanged upper or outer end of the tank to prevent the water from the tank being thrown by centrifugal force over the upper or outer end of the tank and into the space between the tank and the casing where it would mingle with the dried coal. The rigid outer casing is
40 curved inwardly at its top and then extends inwardly and downwardly into the rotary conical receptacle, being spaced therefrom and having the same general shape as the latter.

Three embodiments of the invention and the details of the construction are more fully set forth and described in the accompanying specification and drawing.

In the drawing, Figure 1 is a vertical section through one form of apparatus. Fig. 2 is a vertical section through another form. Fig. 3 is a vertical section through another form. Fig. 4 is a section on the line 2-2, Fig. 1.

55 In the drawings, like characters of refer-

ence indicate corresponding parts in each figure.

Referring to the drawings, A represents a rotary receptacle having its wall constructed to permit the passage of liquid therethrough, as by the formation of a plurality of perforations 10 therein, and having the wall inclined outwardly and upwardly from the bottom, the receptacle illustrated having the general shape of an inverted cone. This receptacle is adapted to be rotated by suitable means, such as a shaft B connected to the bottom 11 of the receptacle and supporting the same. The shaft B may be stepped and driven in any suitable manner.

To collect the moisture passing through the perforated wall of the receptacle, a cylindrical tank C is provided having its upright wall 12 fitting beneath an outturned or curved flange 13, provided on the upper or outer edge of the rotary receptacle, the upper or outer edge of the said wall 12 being provided with an inwardly-turned or curved flange 14 extending parallel with the flange 13, whereby a close joint will be made between the two parts and the escape of liquid prevented, and yet the centrifugal action will not be impeded. The liquid is withdrawn from the tank, either through a suitable pipe 15 or other means. The tank is secured rigidly to a base or support.

To deliver the wet material to the receptacle and guide and retain the dried material passing out of the receptacle, a casing D is provided, the upper edge of which is curved at 16 to extend over the top of the rotary receptacle, whereby the dried material passing out of the rotary receptacle will be guided by the curved interior wall at the top of the casing and pass downwardly in the annular space 17 between the tank C and the casing D. The general shape of the casing D is that of a cylinder and it is secured rigidly to a base. Its upper or outer end is, as shown in Figs. 1, 2 and 3, curved inwardly and downwardly so as to dip into the receptacle and form a conical hopper E. This hopper is imperforate and is spaced from the sides and bottom of the receptacle and is open at the bottom.

In operation, the conical perforated receptacle A is rotated at a high speed, and the material containing the moisture, such as the coal, is fed into the hopper E. When this material falls on the bottom of the re-

ceptacle A, it is by centrifugal force, thrown against the inner wall, which being inclined, causes it to move upwardly in the space between the hopper E and the receptacle A until it reaches the top, when the material will strike the inner side of the curved upper edge 16 of the casing, which being stationary, the centrifugal action on the material ceases and the material drops by gravity through the annular space 17 into suitable receptacles which will be provided to receive the same. Whatever moisture or liquid of any character which is in the material will pass out through the perforations 10, of the receptacle A, while the material is passing upwardly along the wall, and this moisture or liquid will be caught by the tank C and be withdrawn through the outlet pipe 15.

It is important that the casing D should be stationary, since the particles of material thrown from the revolving drum or receptacle will strike against the fixed inner curved side of the casing and drop by gravity, where if the casing were given a movement, the centrifugal force would hold the material against the top of the casing, thus clogging the operation of the machine. It should further be observed that the inwardly turned or curved flange 14 on the tank C prevents the moisture from being thrown or blown over the top of the same out into the space 17. This flange is thus very effective in preventing mixture of the dried constituents and the liquid after they have passed through the separator.

In the form shown in Fig. 2, the shaft B extends downwardly from the bottom 11 of the receptacle, and the parallel flanges 18 and 19 between the tank and revolving receptacle are made U-shaped in form and not curved. To prevent the liquid or moisture passing down the opening 21 left in the tank C, an annular flange 22 is formed around the opening and extends upwardly and fits closely around the bottom 11.

In the form shown in Fig. 4, the receptacle is formed with a lower conical portion 23 and an upper cylindrical portion 24. The preferable construction is shown in Figs. 1 and 2.

From the above, it will be seen that the material may be passed continuously through the apparatus, and by suitable regulation of the same, the whole or any part of the moisture therein may be extracted from the same.

The apparatus shown and described has been given a thorough test with coal containing eighty per cent. moisture, and I have succeeded in obtaining a product having only five per cent. moisture.

Having thus described my invention, I claim:

1. In a centrifugal drier, the combination

of the revoluble conical receptacle having its wall perforated and an outwardly turned flange provided at the upper end, means connected with the bottom thereof for rotating the receptacle, a tank fitting around the receptacle and having an inwardly turned flange at the upper end, the flange of the tank fitting within the flange of the receptacle, and a stationary casing having its wall spaced from the side of the tank and its upper end curved inwardly over and spaced from the upper ends of the tank and receptacle and then extended downwardly into the receptacle and shaped to form a conical hopper, the bottom of which is open and the sides spaced from the perforated wall of the receptacle, the outlet for the material passing upwardly between the receptacle and the hopper being defined by the moving flanged upper end of the receptacle and the rigid curved upper end of the casing whereby the material is caused to strike against the said curved stationary upper end of the casing and then drop by gravity through the space between the casing and the tank.

2. In a centrifugal drier, the combination of the revoluble conical receptacle having its wall perforated, and an outwardly-curved flange provided at the upper end thereof, a shaft connected at its lower end with the bottom of the receptacle for imparting rotation to the latter, a rigidly mounted tank fitting around the receptacle and having its bottom and sides spaced from the receptacle and provided with an inwardly curved flange at its upper end, the flange of the tank fitting within the flange of the receptacle, an outlet for the tank, and a stationary casing having its side walls spaced from the side of the tank and its upper end curved inwardly over and spaced from the upper ends of the tank and receptacle and then extended downwardly into the receptacle and shaped to form a conical hopper, the bottom of which is open and the sides thereof spaced from the perforated wall of the receptacle, the outlet for the material passing upwardly between the receptacle and the hopper being defined by the moving flanged upper end of the receptacle and the rigid curved upper end of the casing whereby the material is caused to strike against the said curved stationary upper part of the casing and then dropped by gravity through the space between the casing and the tank, said space being provided with an outlet at its bottom.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

WILLIAM CLARK MITCHELL.

Witnesses:

F. O. EBB,

WALTER CROWE.