J. McL. CAMERON.

DRYING MACHINE.

APPLICATION FILED APR. 25, 1914.

1,136,933.

Patented Apr. 27, 1915.

3 SHEETS—SHEET 1.

Fig. 1.

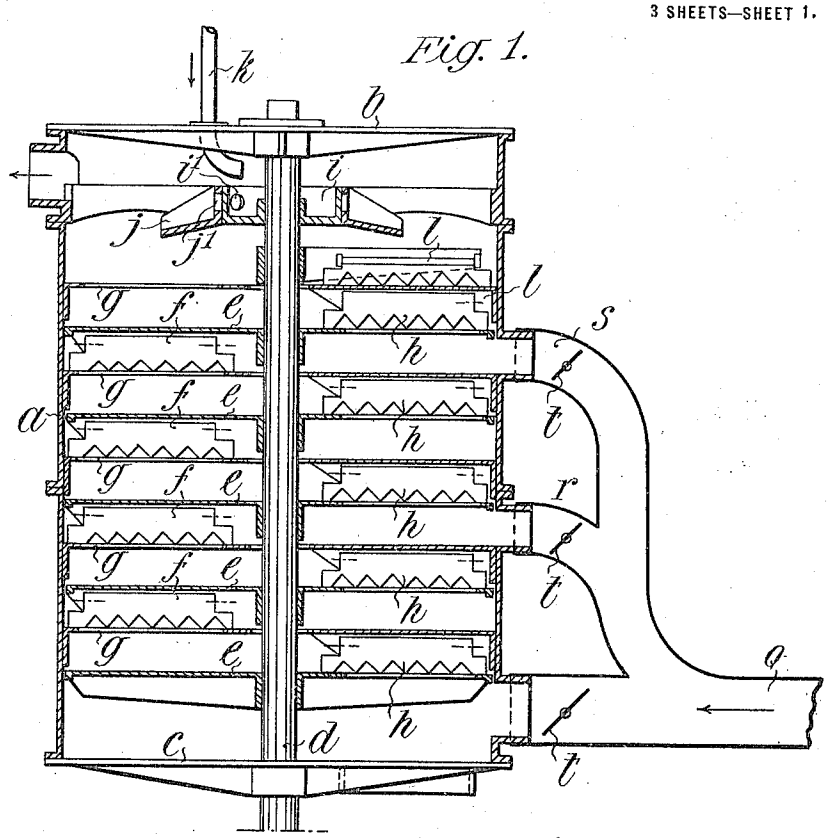
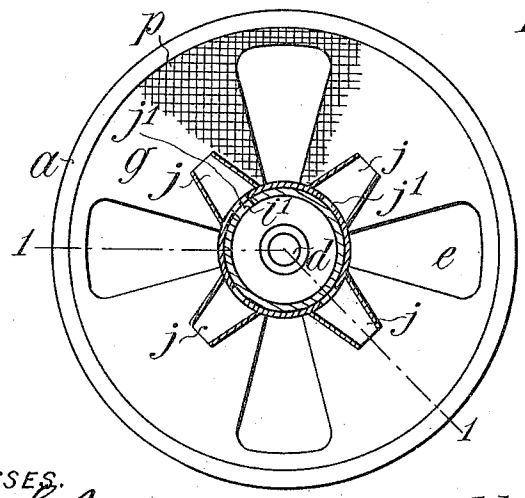


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

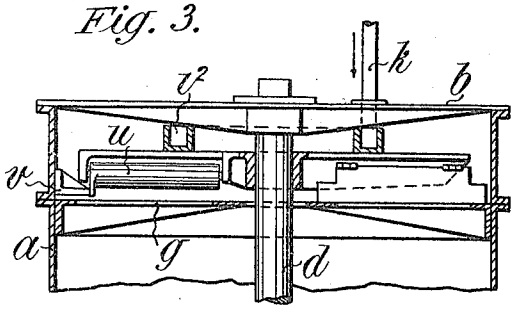


Fig. 4.

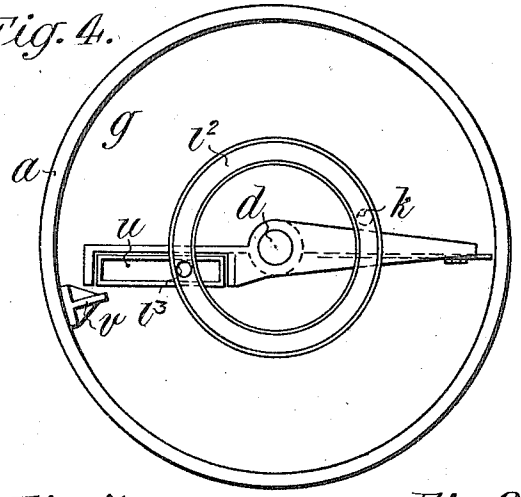


Fig. 7.

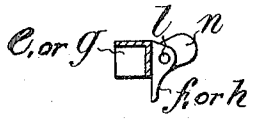


Fig. 8.

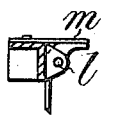


Fig. 9.

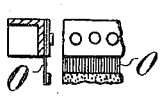
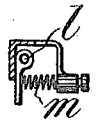


Fig. 10.



Fig. 11.



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3 SHEETS—SHEET 3.

Fig. 5.

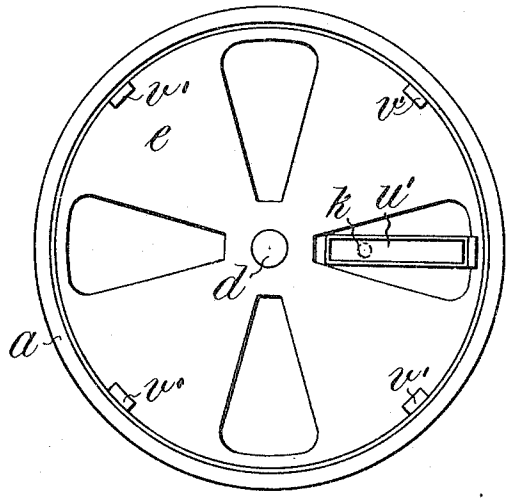


Fig. 6.

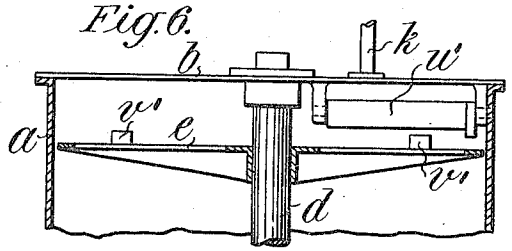


Fig. 12.

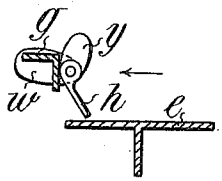


Fig. 13.

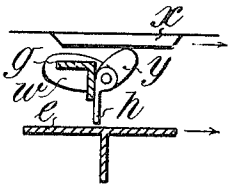
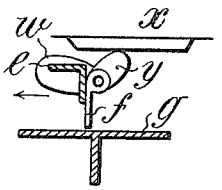


Fig. 14.



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UNITED STATES PATENT OFFICE.

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DRYING-MACHINE.

1,136,933. Specification of Letters Patent. Patented Apr. 27, 1915.

Application filed April 25, 1914. Serial No. 834,495.

To all whom it may concern:

Be it known that I, JOHN McLEOD CAMERON, a subject of His Majesty the King of England, residing at Forest Lodge, Ravenscourt Park, in the county of London, Kingdom of England, have invented certain new and useful Improvements in or Relating to Drying-Machines, of which the following is a specification.

This invention relates to improvements in drying machines of the kind comprising a tower and a central revolving shaft each of which carries a plurality of alternately arranged plates or platforms.

In this class of apparatus it has been proposed to provide hinged deflecting plates on the fixed and revolving plates which serve to deflect the material alternately off the periphery of a revolving plate and down through a central aperture in a fixed plate. Such an arrangement is found to be quite unsuitable for treating materials which are, or eventually become, viscous, such as sewage for which the present invention is particularly suitable as the viscous mass quickly becomes clogged up around the central shaft and at the periphery of the platforms.

To this end the invention consists primarily in the provision, in a machine of the kind described, of means for controlling the distribution of the material to, and through, the machine in a more effective manner, the former by rotary valves and tipping troughs and the latter by controlling the duration of operation of the scrapers and by the provision of radial apertures in the platforms so that the material is swept off in relatively small quantities and not collected in a mass as heretofore in such a machine.

The invention is hereinafter described with reference to the accompanying drawings in which:—

Figure 1 is a vertical sectional elevation of one convenient form of drying machine; Fig. 2 is a sectional plan view thereof; Fig. 3 is a detail sectional elevation illustrating a modification in the feeding device hereinafter referred to; Fig. 4 is a sectional plan view illustrating the single trough and the scraper shown in the preceding figure; Fig. 5 is a detail plan view illustrating an arrangement in which a single non-rotating trough is employed and tipped by rotating tappets; Fig. 6 is a detail sectional view thereof; and Figs. 7 to 14 are detail sectional views of scrapers hereinafter referred to.

As shown in Figs. 1 and 2 of the drawings the machine comprises a cylindrical chamber *a* having top and bottom covers *b* and *c* respectively. Mounted to rotate within the said chamber is a vertically and centrally disposed shaft *d* which carries a plurality of tables *e* and scrapers *f*. The outer casing *a* also carries a plurality of fixed tables *g* and scrapers *h*.

In order to effect the distribution of the incoming material I may, as shown in Figs. 1 and 2, provide in a substantially known manner a rotating valve or cock comprising in the present arrangement a circular chamber or trough *i* which may as shown be conveniently secured to the rotating shaft *d* or driven independently if desired and which by the provision of one or more ports *i'* therein will periodically discharge its contents by way of the ports *j'* by way of the distributing chutes *j* carried by the outer casing *a*, onto the platforms of the uppermost table *g* which in this case is carried by the casing *a*. The material to be treated is fed into the trough *i* by way of a pipe *k* passing through the cover *b* of the chamber *a*.

To insure the subsequent distribution and removal of the material from the surfaces of the platforms *e* or *g* as the case may be as it progresses downwardly through the machine I preferably construct the scrapers *f* and *h* so that they can be attached to their supports by hinge pins *l* and can be retained in or returned to their correct or operative position relative to the platforms by means of springs *m* as in Figs. 8, 10 and 11 or by a counter-weight *n* as in Fig. 7. Or alternatively the scrapers may be made of sheets or narrow strips of elastic material *o* such as spring steel as in Fig. 9.

I construct each of the platforms *e* and *g* with one or more radially disposed apertures therein and with corrugations or indentations as indicated at *p* in Fig. 2 which serve not only to increase the heating surface but help to retard the flow of a liquid material over them and thereby assist in the more effective transmission of heat to the said material at the time when it is most liquid.

The platforms *e* carried by the vertical rotating shaft *d* carry the scrapers *f* operating on the fixed platforms *g* while these scrapers *h* carried by the fixed platforms *g*

operate on the platforms *e* on the shaft *d*. The material is thus removed from a fixed platform *g* and falls through the aperture or apertures therein on to a rotating one *f* and then on to a fixed one *g* again in its progress through the drier.

When very liquid materials have to be dried the gases entering from the conduit Q at the base of the machine are liable to become saturated and ineffective before they reach the upper platforms. To obviate this I take a portion of the gases and admit them at one or more auxiliary inlets *r s* in the higher portion of the machine; suitable valves being provided as shown at *t* for the control of all the aforesaid inlets.

As an alternative method of effecting the distribution of the incoming material I may as in Figs. 3 and 4 employ one or more troughs or receptacles *u* which may as shown be attached to the rotating shaft so as to revolve with it and which may be filled in any convenient manner while in motion such as by means of a circular rotating trough l^2 with outlet l^3 and pipe *k*. This trough, or troughs, as the case may be, is adapted to be tipped up so as to discharge its contents on to the platform *g* by means of suitable tappets, or wipers *v* which come in contact with the trough, or a suitable projection provided thereon, as the said trough rotates. As a still further alternative I could, as in Figs. 5 and 6, employ one or more fixed troughs *u'* which could be tipped by one or more tappets or wipers *v'* on one of the rotating tables *e*.

In order to control the operation of the scrapers and to insure that the material fed on to one table shall be uniformly distributed on to the next table below it I provide means for keeping them in operation during only a portion of their revolution. To this end I may as shown in Figs. 12 to 14 provide them with a counter-weight *w* at their ends which would normally serve to keep them lifted up clear of the material on the top of the tables on which they operate as shown in Fig. 12. For putting them periodically in operation I provide one or more wipers or tappets *x* which are adapted to engage with projections *y* on one or more of the scrapers according to the arrangement adopted. Thus to operate a relatively fixed scraper *h* I could as in Fig. 13 employ one or more rotating wipers or tappets *x* which would engage the portions or projections *y* on the scrapers to keep them in position for a portion of their travel. Similarly I could as is shown in Fig. 14 provide a rotating scraper *f* and a fixed wiper *x* on the chamber *a* which would act in a similar manner. In some cases as in Figs. 1 and 2, where both fixed and rotating tables *e g*, and also fixed and rotatable scrapers *f* and *h*, are employed which are carried by the outer casing *a* and the revolving shaft *d* respectively I might operate or control the duration of operation of one or both sets of scrapers *f* and *h* in the manner hereinbefore described.

What I claim as my invention and desire to secure by Letters Patent of the United States is:—

1. A drying machine comprising in combination a casing or tower, a central rotatable shaft therein, fixed platforms or drying floors on the casing, rotating platforms on the central shaft, said fixed and rotating platforms having radially arranged apertures, and scrapers carried by said platforms for the purpose of controlling the distribution of the material, substantially as described.

2. A drying machine comprising in combination a casing or tower, a central rotatable shaft therein, fixed platforms or drying floors on the casing, rotating platforms on the central shaft, said fixed and rotating platforms having radially arranged apertures located at an intermediate point between the centers and peripheries of the said platforms, scrapers carried by said platforms for the purpose of controlling the distribution of the material and means for controlling the supply of the material to be treated, substantially as described.

3. A drying machine comprising in combination a casing or tower, a central rotatable shaft therein, fixed platforms or drying floors on the casing, rotating platforms on the central shaft, said fixed and rotating platforms having radially arranged apertures, scrapers carried by said platforms for the purpose of controlling the distribution of the material and means for controlling the supply of the material to be treated, comprising a rotating trough, substantially as described.

4. A drying machine comprising in combination a casing or tower, a central rotatable shaft therein, fixed platforms or drying floors on the casing, rotating platforms on the central shaft, said fixed and rotating platforms having radially arranged apertures, scrapers carried by said platforms for the purpose of controlling the distribution of the material and means for controlling the supply of the material to be treated, comprising a distributing trough adapted to be automatically tipped at intervals to cause it to discharge its contents substantially as described.

5. A drying machine comprising in combination a casing or tower, a central rotatable shaft therein, fixed platforms or drying floors on the casing, rotating platforms on the central shaft, said fixed and rotating platforms having radially arranged apertures, scrapers carried by said platforms for the purpose of controlling the distribution of the material and means for automati-

cally controlling the duration of operation of the scrapers substantially as described.

6. A drying machine comprising in combination a casing or tower, a central rotatable shaft therein, fixed platforms or drying floors on the casing, rotating platforms on the central shaft, said fixed and rotating platforms having radially arranged apertures, scrapers carried by said platforms for the purpose of controlling the distribution of the material and corrugations or indentations on the platforms, substantially as described.

7. A drying machine comprising a casing or tower, a central shaft therein, fixed platforms or drying floors arranged at spaced points within the casing and extending from the walls thereof to the central rotatable shaft, rotating platforms spaced from each other and also from the fixed platforms and extending from the shaft adjacent to the walls of the said tower or casing, said fixed and movable platforms being provided at points between their centers and peripheries with apertures, scrapers carried by the said platforms, and a plurality of inlets for the introduction of hot gases to the casing or tower, said inlets coinciding with certain of the spaces between the platforms.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JOHN McLEOD CAMERON.

Witnesses:

FRANK BLAKEY,

C. S. WITHERS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."