J. W. LEITCH.

APPARATUS FOR SOLIDIFYING OR CONCENTRATING MATERIALS.

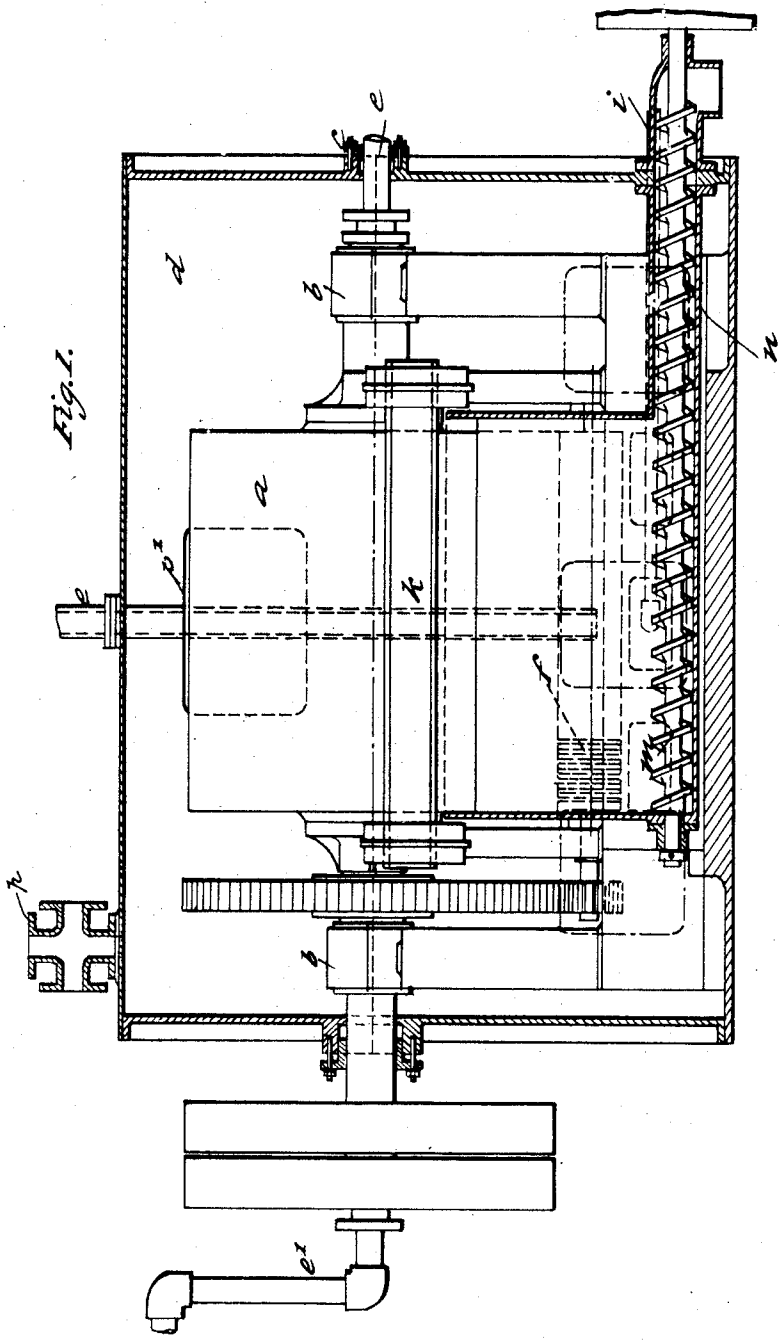
APPLICATION FILED NOV. 14, 1918.

1,343,833.

Patented June 15, 1920.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

D. L. Norris

Norris L. Sumby.

Inventor

John W. Leitch,

by James L. Norris,

Attorney.

J. W. LEITCH.

APPARATUS FOR SOLIDIFYING OR CONCENTRATING MATERIALS.

APPLICATION FILED NOV. 14, 1918.

1,343,833.

Patented June 15, 1920.

3 SHEETS—SHEET 2.

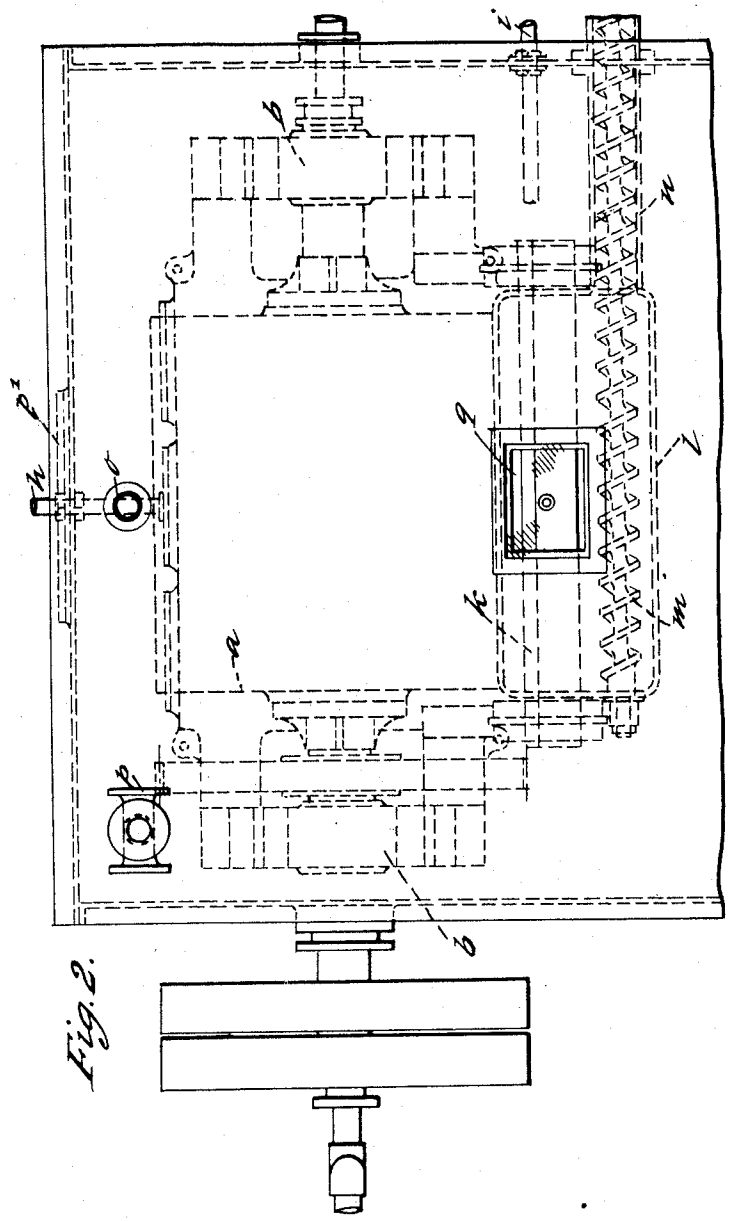


Fig. 2.

Witnesses

Norris L. Bumby.

Inventor

John W. Leitch,

by James L. Norris,

Attorney.

J. W. LEITCH.

APPARATUS FOR SOLIDIFYING OR CONCENTRATING MATERIALS.

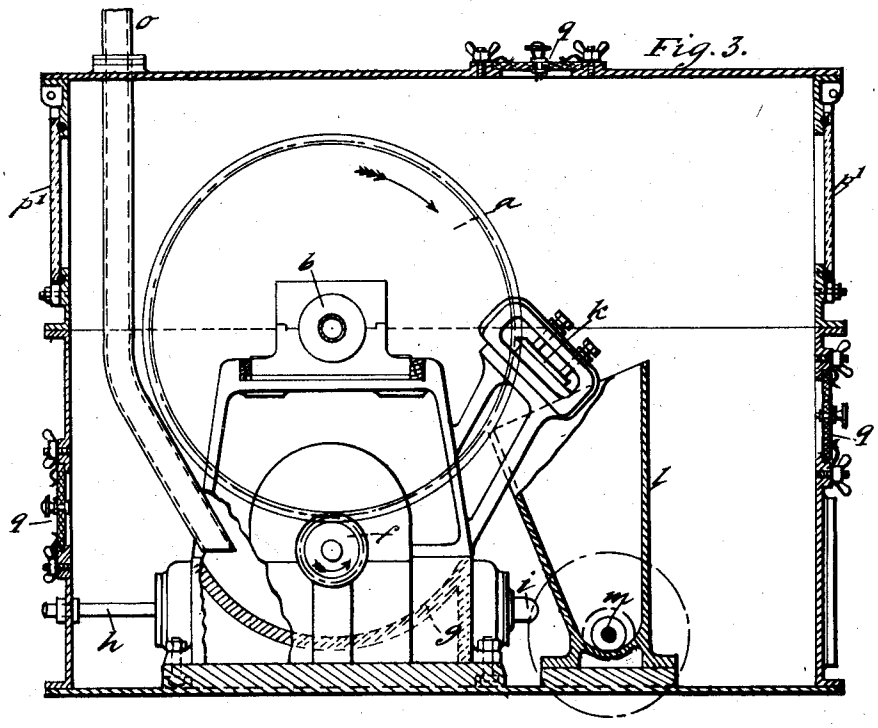
APPLICATION FILED NOV. 14, 1918.

1,343,833.

Patented June 15, 1920.

3 SHEETS—SHEET 3.

Fig. 3.



Witnesses

Norris L. Sumby.

Inventor

John W. Leitch,

by James L. Norris

Attorney

UNITED STATES PATENT OFFICE.

JOHN WALKER LEITCH, OF HUDDERSFIELD, ENGLAND.

APPARATUS FOR SOLIDIFYING OR CONCENTRATING MATERIALS.

1,343,833. Specification of Letters Patent. Patented June 15, 1920.

Application filed November 14, 1918. Serial No. 262,551.

To all whom it may concern:

Be it known that I, JOHN WALKER LEITCH, B. Sc., a subject of the King of Great Britain, residing in Huddersfield, England, have invented certain new and useful Improvements in Apparatus for Solidifying or Concentrating Materials, of which the following is a specification.

In using a revolving cylinder internally heated or cooled for the purpose of heating or cooling a liquid material fed to its external surface, the solidified or concentrated material being removed from the surface by a stationary scraper, it is sometimes advantageous to apply the liquid by means of a feed roller revolving in contact with the cylinder and also in a bath of the liquid. The main advantage resides in the uniformity and thinness of the film which can be applied in this manner as compared with other modes of feeding; this means diminution of heating or cooling surface for a given out-put. The advantage becomes of more particular importance when, for any reason, the apparatus has to be inclosed in an air-tight casing, more especially when such reason is the maintenance of a vacuum. Nevertheless, although it has been proposed to inclose a revolving cylinder evaporator or cooler of the kind in question, fed by other means than a feed-roller in an air-tight chamber and to conduct the feeding and removal of the material without interrupting the operation or opening the chamber, the advantage of adopting this mode of feeding within the chamber has not been appreciated.

My invention consists in the combination of a cylinder apparatus for heating or cooling liquids, of the kind in which the liquid is fed to the revolving cylinder by a feed-roller and the concentrated, or solidified material is removed by a scraper, with an air-tight chamber inclosing the whole apparatus and devices for feeding the liquid and removing the product without interrupting the operation of the apparatus or opening the chamber.

In the accompanying drawings the invention is illustrated as applied to a machine such as is described in my British Specification No. 15,063 of 1915.

Figure 1 is a sectional elevation, Fig. 2 a plan and Fig. 3 a cross section.

a is the cylinder, the hollow shaft of which turns in bearings *b* and extends through stuffing boxes *c* in the ends of the air-tight chamber *d*. The fluid for cooling the cylinder enters the latter by way of pipe *e* and the hollow shaft and leaves it through the shaft and the outlet pipe *e'* at the other end of the cylinder having preferably circulated in the cylinder as described in the said specification. The grooved roller *f* driven by the gearing shown revolves partly immersed in the molten material contained in the trough *g* and being in contact with the cylinder applies the material to the surface of the latter in strips. Steam is admitted to the jacket of the trough through pipe *h* and leaves it through pipe *i*. The adjustable scraper *k* is situated above a receiving hopper *l* at the bottom of which revolves a worm conveyer *m* which works with close fit in a tubular extension *n* of the hopper. This extension is continued outside the chamber.

The liquid material (in this case supposed to be molten phenylenediamin which it is desired to solidify by chilling and obtain in a more or less finely subdivided state, the operation being conducted in as good a vacuum as possible) is run into the trough continuously through pipe *o* and the tubulure *p* is connected with a vacuum pipe. The dusty material falling from the scraper *k* is removed by the conveyer *m* and packs the tubular extension *n* sufficiently tightly to maintain the vacuum.

The chamber may have sight doors *p'* and sight glasses *q*.

The modifications necessary for keeping the chamber supplied with an indifferent gas when the operation is to be conducted in an atmosphere of such gas, and for removing vapor and condensing it, if desired, outside the chamber, when evaporation is the process proceeding in the chamber, are obvious. For confining the dust in cases where the material is poisonous or otherwise injurious the construction shown may suffice, the tubulure *p* being plugged with filtering material to filter expelled air.

Having thus described the nature of the said invention and the best means I know of carrying the same into practical effect, I claim:—

1. An apparatus of the class described, comprising a revolving cylinder, an air-tight casing in which the cylinder is inclosed, a feed roller within the casing revolving with its periphery in contact with the liquid to be treated and with the cylinder, a hopper contained within the casing to receive the material from the cylinder, a delivery pipe extending from said hopper to the exterior of the apparatus, means within the hopper for continuously removing the material from the hopper through said delivery pipe, the material in said delivery pipe serving to exclude air from the casing, and means for continuously feeding liquid to the casing in an air-tight manner.

2. An apparatus of the class described, comprising a revolving cylinder, an air-tight casing therefor, said cylinder having hollow trunnions for the passage of heating or cooling fluid, bearings in the ends of the casing for said trunnions, a trough in said casing, means for feeding liquid to said trough from the exterior of said casing, a roller revolving in said trough and in contact with said cylinder, a scraper in said casing and in contact with said cylinder, a hopper in said casing to receive material removed from said cylinder by said scraper, a tube extending from the bottom of said trough to the exterior of the casing, and a positively driven worm conveyer revolving in the bottom of said hopper and in said tube and closely fitting the latter.

In testimony whereof I have signed my name to this specification.

JOHN WALKER LEITCH.