Feb. 17, 1931. L. ALTPETER 1,793,204

DEVICE FOR DRAWING OFF FLUID FROM FINE GRANULAR MATERIAL IN CENTRIFUGAL MACHINES

Filed Aug. 15 1928

Fig. 1

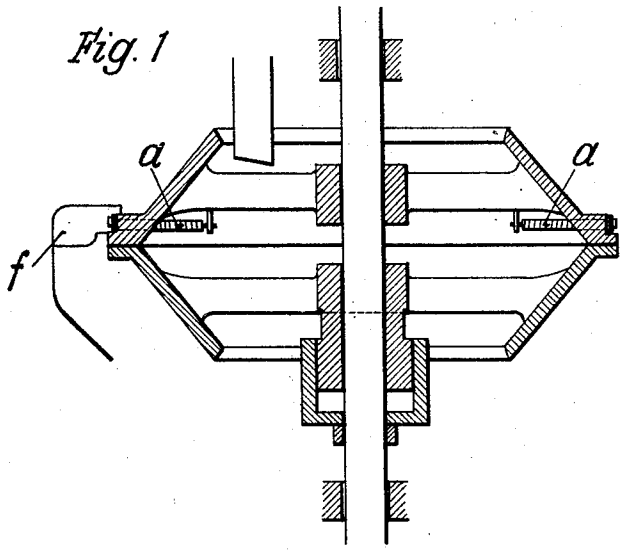


Fig. 3

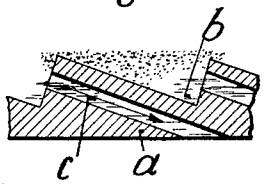


Fig. 2

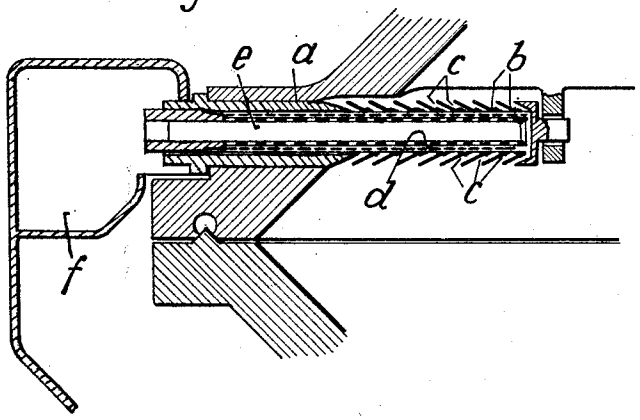


Fig. 4

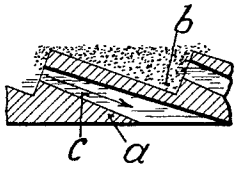
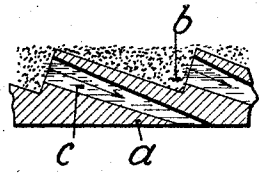


Fig. 5



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UNITED STATES PATENT OFFICE

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DEVICE FOR DRAWING OFF FLUID FROM FINE GRANULAR MATERIAL IN CENTRIFUGAL MACHINES

Application filed August 15, 1928, Serial No. 299,670, and in Germany August 19, 1927.

In centrifugal machines having an impervious drum jacket and in centrifugal machines of the type having two cups or cones it is well-known that the centrifugal force resulting from the high circumferential velocity causes separation of the material centrifuged into lighter and heavier constituents so that the specifically lighter constituents become located nearer the drum axis and the specifically heavier constituents in the outer zone of the centrifuge.

In the case of finely granular material, for instance fine carbon, it was hitherto impossible to effect by centrifuging complete separation of the solid and liquid constituents because the granular material even after centrifuging still contains so-called "voids" which naturally fill with liquid.

Volumetrically the quantity of liquid may amount to 50% of the solid material contained in the centrifuge after the withdrawal of the water.

This quantity of liquid still remaining in the centrifuged material after the normal withdrawal of the water, which in most cases is highly disadvantageous for the subsequent employment of the solid material, for example in the case of fine carbon, can be removed from the centrifuge during the continuous centrifuging operation neither by devices actuated from outside nor by the methods known hitherto.

In order to overcome effectively the deficiencies described above, according to the present invention in a centrifugal machine of the multiple cup or cone type or in a machine with a cylindrical drum jacket one or more water withdrawal tubes or pockets are arranged in the drum jacket of the centrifuge so as to extend into the "solid" zone of the material centrifuged and are provided with orifices or bores for the liquid to be drawn off. Said tubes are constructed in a novel manner which enables during the uninterrupted centrifuging operation continual emergence of liquid from the material contrifugal without the solid constitutents of said material being carried along therewith provided that they are specifically heavier than the liquid.

One embodiment of the invention is illustrated in Fig. 1 as applied to a two-cup or cone centrifuge.

Fig. 2 being a sectional view of a part thereof on a larger scale and

Figs. 3–5 detail views.

The parts of the water withdrawal tubes *a* projecting into the zone of the material centrifuged have annular or helical recesses or grooves *b* cut therein and small orifices or bores *c* bored in a direction oblique to the axis of the centrifuge; the specifically lighter liquid contained in the voids of the granular material centrifuged flows out continuously through said orifices. The specifically heavier solid material is forced by the centrifugal action towards the outer zone of the centrifuge so that clogging of the water withdrawal tubes *a* and carrying away of fine granular material is prevented by the grooves *b* and the obliquely disposed liquid out-flow passages *c*. This may be seen more particularly from Figs. 3–5 in which the disposition of the granular material in relation to the orifices *c* is evident. The grooves or recesses in front of the bores or orifices may be replaced by mere depressions and said grooves, recesses or depressions are not absolutely essential. Where they are not employed it is particularly advantageous to make the bores *c* conical outwardly or inwardly.

Since the bores *c* overlap, the possibility of unimpeded discharge of the liquid outwardly is ensured in every zone of the material centrifuged. The effect is as if a sponge filled with liquid is compressed.

The bores or recesses *c* may be of various dimensions and may be arranged relatively to one another in any desired manner depending upon the particular end in view.

In order to make it impossible for lighter constituents in the material centrifuged to emerge through the water withdrawal tubes *a*, a fine mesh wire, gauze or filter cloth *d* may be inserted in the interior of said tubes, said insertion may be held in position by a perforated tube *e*.

The liquid emerging from the water withdrawal tubes *a* is caught in any appropriate

manner, for example by a trough *f* at the periphery of the centrifuge and is led away therefrom.

Cleaning of the tubes *a* may be performed by washing them out with water forced in under pressure from outside, the centrifuge being stationary and the tubes *a* may be provided with suitable connections for this purpose.

Any number of such water withdrawal tubes may be provided as required and they may be arranged, with material from which it is difficult to remove the water, in both the upper and lower cups or cones of the centrifuge or also at the cylindrical peripheral surface of a drum centrifuge.

To enable bores or orifices *c* flaring conically inwardly to be produced easily from the inside of a water withdrawal tube said tube *a* may be made in a plurality of longitudinal sections.

What I claim is:—

1. The combination with a centrifugal machine, comprising a rotatable drum, of means for drawing off fluid from finely granular material in said drum, said means comprising dehydration pockets the walls of which run parallel to each other and extend into the zone of solid material, said dehydration pockets being provided with perforations in their walls, said perforations extending obliquely from the inside of the dehydration pockets toward the wall of the drum and forming an acute angle with the inner surface of the dehydration pockets.

2. The combination with a centrifugal machine, comprising a rotatable drum, of means for drawing off fluid from finely granular material in said drum, said means comprising pipes passing through the wall of said drum and extending into the zone of solid material therein, the walls of said pipes being perforated to permit the passage of fluid therethrough, said pipes being provided in their outer surface with spiral recesses in communication with the perforations.

3. The combination with a centrifugal machine, comprising a rotatable drum, of means for drawing off fluid from finely granular material in said drum, said means comprising pipes passing through the wall of the drum and extending into the zone of solid material therein, said pipes having perforations in the walls thereof directed at an oblique angle to the axis of the drum and in overlapping relation to each other.

4. The combination with a centrifugal machine, comprising a rotatable drum, of means for drawing off fluid from finely granular material in said drum, said means comprising perforated pipes passing through the wall of the drum and extending into the zone of solid material therein, the perforations of said pipes being tapered in diameter from end to end.

5. The combination with a centrifugal machine, comprising a rotatable drum, of means for drawing off fluid from finely granular material in said drum, said means comprising pipes passing through the wall of said drum and extending into the zone of solid material therein, the walls of said pipes being perforated to permit the passage of fluid therethrough, and a screening member disposed within each of said pipes and covering the inner ends of said perforations.

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

LUDWIG ALTPETER.