Nov. 17, 1936. I. SABLIK 2,061,257

ROTARY DRUM FILTER

Filed March 17, 1934

Fig. 1

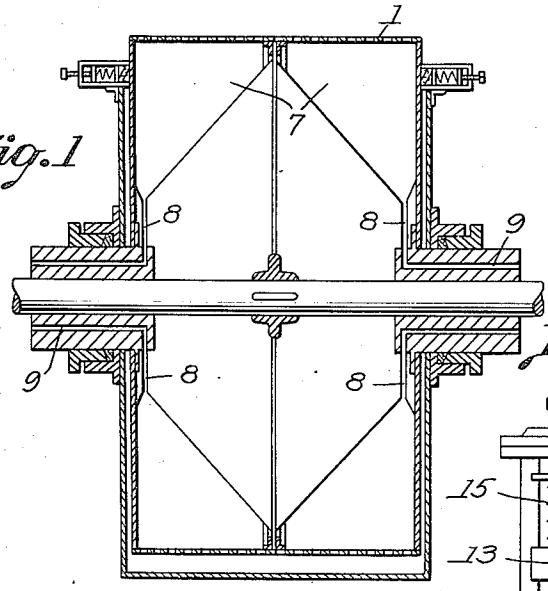


Fig. 3

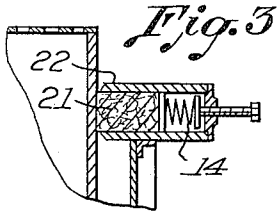


Fig. 4

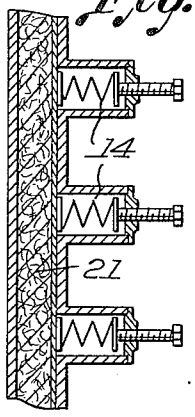


Fig. 7

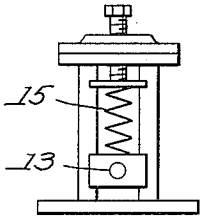


Fig. 8

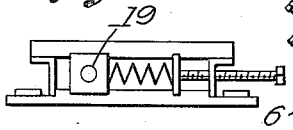


Fig. 2

Fig. 5

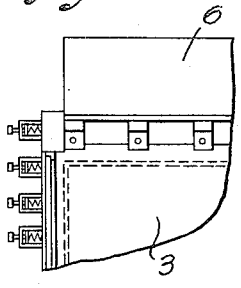
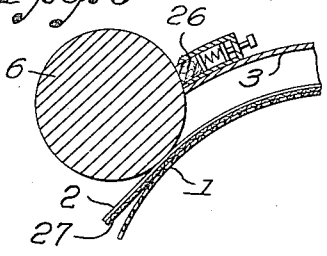


Fig. 6



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Patented Nov. 17, 1936

2,061,257

UNITED STATES PATENT OFFICE

2,061,257

ROTARY DRUM FILTER

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Application March 17, 1934, Serial No. 716,037. In Czechoslovakia and Germany March 20, 1933

5 Claims. (Cl. 210—198)

The present invention relates to a rotary drum filter in which the drum filter surface is continuously subjected to a surplus pressure.

An embodiment of the invention is shown, by way of example, in the accompanying drawing, in which

Fig. 1 is an axial section.

Fig. 2 is a side elevation, partly in section.

Figs. 3 to 6 illustrate details relating to the sealing of the pressure chamber.

Figs. 7 and 8 illustrate details of the bearings.

A filter drum 1 is encompassed by an endless filter cloth 2, and is located within a stationary pressure-tight casing 3 formed with an opening 25, the location of the said drum being such that on the periphery between the drum and the said casing a pressure chamber 5 is formed into which the liquid to be filtrated is continuously forced through one or a plurality of ports 4 provided in the said casing.

The filter cloth 2 rests on, and is fastened to, an endless wire gauze belt 27, which revolves positively with the drum, as indicated by an arrow (Fig. 2). The filter cloth with the deposit adhering thereto leaves the pressure space 5 of the casing 3 and is brought beneath a pressure roller 6, while the filtrate flows into the compartments 7 provided within the drum, and is discharged through pipes 8 and registering ports 9 formed in the drum hubs. Since seven eighths of the drum periphery are encompassed by the filter cloth, and are thus within the pressure space, the very best utilization of the filter surface is rendered possible.

On leaving the drum, the deposit is subjected to another filtering pressure exerted by the pressure roller 6, and, while resting on the filter cloth, is moved to the taking-off roller 10 whence it drops, that is, is removed. On its way to the guide roller 11, the filter cloth is rinsed or swilled by means of a water ejector device 17, and cleansed by means of a pressure air blast 18.

From the guide roller 11, the endless filter cloth is carried to the roller 12, whereupon it will again encompass the filter drum, and then be moved into the pressure chamber 5.

The sealing of the places where the filter cloth leaves or, respectively, enters the pressure casing is achieved through pressure roller 6 and roller 12 respectively. Each of these rollers is, on its periphery, provided with a jacket made of some suitable resilient material, and is supported by a bearing 13 (Fig. 7) provided with a pressure spring 15 adapted to adjust the pressing action on the drum of the respective roller, whereby the thickness of the deposit cake is also controlled.

The section of the drum surface between the rollers 6 and 12 is on the outside of the pressure casing. The sealing in a radial direction, that is, the lateral pressure-tight joint of the space between the casing front face and the drum front face is effected by a packing strip 21 (Figs. 3 and 4) located within a casing 22. Spaced adjustable pressure springs 14 are provided within the said casing, which springs press the packing strip against the drum front face.

The sealing between the casing 3 and the rollers 6 and 12 respectively at *a* and *b* (Fig. 2) is effected in a similar way. As shown in Figs. 5 and 6, the packing strip 26, which is also located within an iron sheet casing, applies pressure to the rollers. Equally, spaced pressure springs are arranged on the casing. Roller 10, from which the cake is removed, is provided with an adjustable bearing 19 (Fig. 8) to render the tensioning of the filter cloth possible.

Rotary pressure drum filters according to the present invention present substantial advantages over suction cell filters. By working with surplus pressure, it is possible to obtain a solid deposit of greater thickness and fairly dry condition, due to which subsequent drying will not be required in most cases. The deposit will drop, by itself, off the sieve, and heat consumption for subsequent working-up will be less.

A further advantage will be found in the high efficiency of the apparatus in proportion with the surface unit of the filter surface, which shows favorably in the low prime cost. The space required is very small in comparison with other filter plants.

Power consumption is particularly little, since there is no expenditure of energy such as is the case in suction cell filters, for dead suction and replenishing of the cells.

The apparatus described can be used, to particular advantage, in the manufacture of cement, sugar or paper.

What I claim is:

1. In a rotary drum filter, the combination with an endless filter cloth, of a revolving filter drum, a fluid-tight casing about said drum, means for introducing into said casing and about said drum a fluid under pressure greater than that on the filtrate side of the drum, said casing having an opening through which every portion of the area of the said filter cloth temporarily leaves the said casing and returns thereto, a taking-off roller, outside said casing, for removing the filter deposit,

a guide roller in fluid-tight relation to said filter drum and said casing at the entrance of said cloth into the said casing, a roller in fluid-tight relation to said drum and said casing at the exit of the cloth from the casing, said cloth being trained about said drum and taking-off and guide rollers, means for completely sealing the space between said drum and casing entirely about said opening whereby pressure may be maintained in said space higher than outside said casing and at the same time ingress and egress of the filter cloth through said opening is permitted, and means for withdrawing filtrate from the interior of the drum.

2. In a rotary drum filter, the combination with an endless filter cloth, of a revolving filter drum, a fluid-tight casing about said drum, means for introducing into said casing and about said drum a fluid under pressure greater than that on the filtrate side of the casing, said casing having an opening through which every portion of the area of the said filter cloth temporarily leaves the said casing and returns thereto, a taking-off roller, outside said casing for removing the filter deposit, a spring-pressed guide roller in fluid-tight relation to said filter drum and said casing at the entrance of said cloth into said casing, a spring-pressed roller in fluid-tight relation to said drum and said casing at the exit of the cloth from the casing, said cloth being trained about said drum and taking-off and guide rollers, means for completely sealing the space between said drum and casing entirely about said opening whereby pressure may be maintained in said space higher than outside said casing and at the same time ingress and egress of the filter cloth through said opening is permitted, and means for withdrawing filtrate from the interior of the drum, the said spring-pressed rollers revolving in an opposite direction to the filter drum.

3. In a rotary drum filter, the combination with an endless filter cloth, of a revolving filter drum, a fluid-tight casing about said drum, means for introducing into said casing and about said drum a fluid under pressure greater than that on the filtrate side of the casing, said casing having an opening through which every portion of the area of the said filter cloth temporarily leaves the said casing and returns thereto, a taking-off roller, outside said casing, for removing the filter deposit, a spring-pressed guide roller in fluid-tight relation to said filter drum and said casing at the entrance of said cloth into said casing, a spring-pressed roller in fluid-tight relation to said drum and said casing at the exit of the cloth from the casing, said cloth being trained about said drum and taking-off and guide rollers and means for withdrawing filtrate from the interior of the drum, the said spring-pressed rollers revolving in an opposite direction to the filter drum, and means for completely sealing the space between said drum and casing entirely about said opening including packing strip casings mounted on said drum casings and spring-pressed packing strips in said packing casings bearing against said spring-pressed rollers and sealing said drum casing in a fluid-tight manner to said spring-pressed rollers whereby pressure may be maintained in said space higher than outside said casing and at the same time ingress and egress of the filter cloth through said opening is permitted.

4. In a rotary drum filter, the combination with an endless filter cloth, of a revolving filter drum, a fluid-tight casing about said drum, means for introducing into said casing and about said drum a fluid under pressure greater than that on the filtrate side of the casing, said casing having an opening through which every portion of the area of the said filter cloth temporarily leaves the said casing and returns thereto, a taking-off roller, outside said casing, for removing the filter deposit, a spring-pressed guide roller in fluid-tight relation to said filter drum and said casing at the entrance of said cloth into said casing, a spring-pressed roller in fluid-tight relation to said drum and said casing at the exit of the cloth from the casing, said cloth being trained about said drum and taking-off and guide rollers and means for withdrawing filtrate from the interior of the drum, the said spring-pressed rollers revolving in an opposite direction to the filter drum, and means for completely sealing the space between said drum and casing entirely about said opening including packing strip casings mounted on said drum casing and packing strips in said packing strip casings spring-pressed against the ends of said drum to form a fluid tight seal between said drum and said casing whereby pressure may be maintained in said space higher than outside said casing and at the same time ingress and egress of the filter cloth through said opening is permitted.

5. In a rotary drum filter, the combination with an endless filter cloth, of a revolving filter drum, a fluid-tight casing about said drum, means for introducing into said casing and about said drum a fluid under pressure greater than that on the filtrate side of the casing, said casing having an opening through which every portion of the area of the said filter cloth temporarily leaves the said casing and returns thereto, a taking-off roller, outside said casing, for removing the filter deposit, a spring-pressed guide roller in fluid-tight relation to said filter drum and said casing at the entrance of said cloth into said casing, a spring-pressed roller in fluid-tight relation to said drum and said casing at the exit of the cloth from the casing, said cloth being trained about said drum and taking-off and guide rollers and means for withdrawing filtrate from the interior of the drum, the said spring-pressed rollers revolving in an opposite direction to the filter drum, and means for completely sealing the space between said drum and casing entirely about said opening including packing strip casings mounted on said drum casing and spring-pressed packing strips in said packing strip casings bearing against said spring-pressed rollers and sealing said drum casing in a fluid-tight manner to said spring pressed rollers, other packing strip casings mounted on said drum casing and packing strips in the last mentioned packing strip casings spring-pressed against the ends of said drum to form a fluid-tight seal between the drum and the drum casing whereby pressure may be maintained in said space higher than outside said casing and at the same time ingress and egress of the filter cloth through said opening is permitted.

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