May 9, 1939. T. MÜLLER 2,157,716

DRYING APPARATUS

Filed March 11, 1937

Fig. I

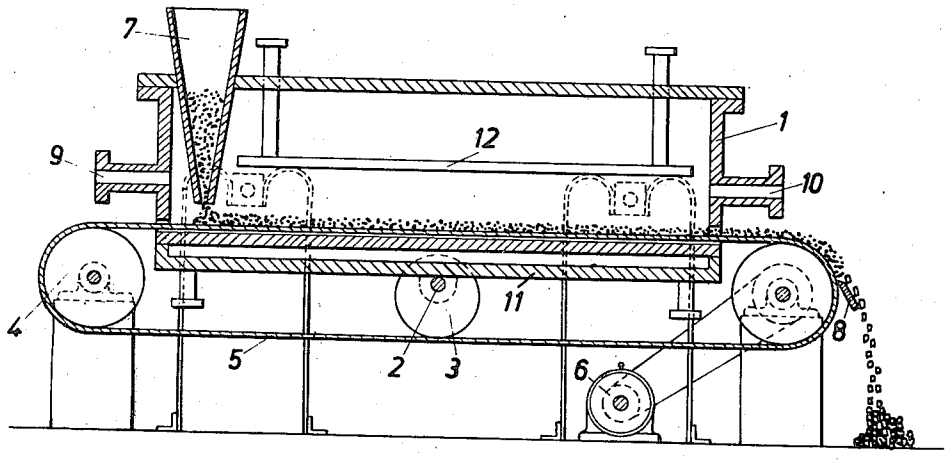
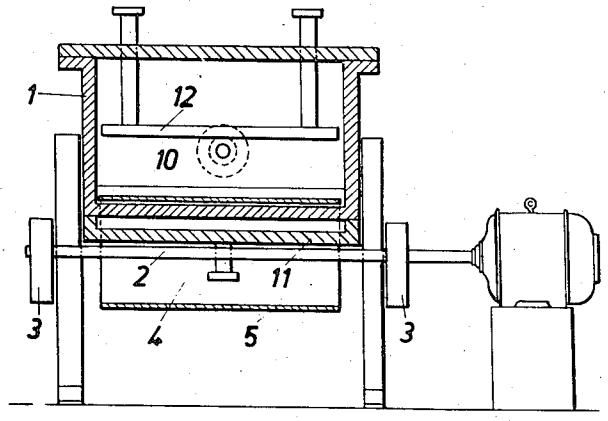


Fig. II



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DRYING APPARATUS

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6 Claims. (Cl. 34—38)

This invention relates to a drying apparatus.

Various drying apparatus are known, wherein drying is effected upon a transport channel with high frequency vibration, i. e., for instance about 1000 oscillations per minute. The drying of the material upon such a vibrated transport channel has the advantage that the material to be dried is simultaneously transported and dried, since by means of the vibrations a great part of the moisture is caused to come to the surface, for instance, in the case of paste-like material, so that that part of the moisture coming to the surface can be removed rapidly. While drying of such pastes and slurries proceeds first without any difficulties and the material to be dried behaves under the influence of the vibration as a thick liquid, later on adhering of the material to the transport channel and sticking together occurs, this in every case depending on the degree of moisture varying according to the material to be dried. By this sticking together and adhering to the transport channel, in the end the material to be dried clogs the transport channel, so that further working is made impossible.

In accordance with the present invention these difficulties are overcome and good drying or cooling of pastes and slurries is made possible by means of such vibrating transport channels if an auxiliary means is provided which in the critical moment prevents sticking together or adhering of the material to the channel and effects the transport of the material to be treated. The said auxiliary means may be variously constructed.

I prefer to provide at the bottom of the transport and drying channel a transport band, a chain conveyor, or the like. By this means an even transport over the whole length of the vibrating transport channel is made possible since in that case it is immaterial at what spot of the vibrating transport channel adhering or sticking together occurs.

The transport band may be driven either by an independent motor, or the band may be conveyed by the vibrations of the vibrating transport channel. Also in that case adhering and sticking together of the material to be dried is avoided, though it must be admitted that the capacity of the transport channel cannot be influenced in the same manner as in the case where the transport band, etc., is independently driven.

The apparatus may also be used as a cooling apparatus if the material to be cooled is liable to clog or stick to the walls of the apparatus during cooling. Since for drying or cooling purposes in most cases a current of hot or cold air is blown over the surface of the material, it is advisable to provide the channel with a cover and to conduct the conveyor through sluices at the fore and rear end of the channel.

The enclosed drawing shows one mode of execution of the apparatus schematically.

Figure I is a longitudinal section of the apparatus. Figure II is a cross section of the apparatus as shown in Figure I. The numerals in both figures indicate the same parts of the apparatus. 1 is the transport channel which by means of a shaft 2 driven by an appropriate means is caused to vibrate by means of the eccentric pendula 3. Over the bottom of the channel a transport-band moves over discs 4. Driving of the transport-band may be effected without a special motor only by means of the vibrations of the channel or also by the motor vibrating the channel, or by means of an independent driving-motor 6. The material to be dried is introduced by means of the feeding device 7, and in the case where it is not discharged automatically at the end of the transport means, it is removed by a discharge means 8. Drying or cooling respectively may be effected by means of hot or cold air which is introduced and discharged by means of pipes 9 and 10 respectively in parallel or counter current. Furthermore the transport channel may be provided with a heating or cooling jacket 11, or heating means 12 may be provided in the channel above the material to be dried.

I claim:

1. In a device for drying and cooling pastes and slurries the combination which comprises a trough, means for vibrating said trough to impart translatory movement to material contained in said trough from an inlet near one end of the trough to an outlet at the opposite end of said trough and means moving over the bottom of said trough to prevent cohesion and adhesion of the material under treatment in said trough.

2. In a device for drying and cooling pastes and slurries the combination which comprises a trough having an imperforate bottom, means for vibrating said trough to impart translatory movement to material contained in said trough from an inlet near one end of the trough to an outlet at the opposite end of said trough and means moving over the bottom of said trough to prevent cohesion and adhesion of the material under treatment in said trough.

3. In a device for drying and cooling pastes and slurries the combination which comprises a trough having an imperforate bottom, means for vibrating said trough to impart translatory movement to material contained in said trough from an inlet near one end of the trough to an outlet at the opposite end of said trough and an endless conveyor moving over the bottom of said trough to prevent cohesion and adhesion of the material under treatment in said trough.

4. In a device for drying and cooling pastes and slurries the combination which comprises a trough having an imperforate bottom, means for vibrating said trough to impart translatory movement to material contained in said trough from an inlet near one end of the trough to an outlet at the opposite end of said trough and a conveyor belt moving over the bottom of said trough to prevent cohesion and adhesion of the material under treatment in said trough and to effect transport of said material.

5. A device as claimed in claim 4 wherein the vibrations of the trough serve to drive the conveyor belt.

6. A device as claimed in claim 4 wherein a motor is provided for driving the conveyor belt independently of the movement of the trough.

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