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MACHINE FOR TREATING MATERIALS

Filed March 15, 1927

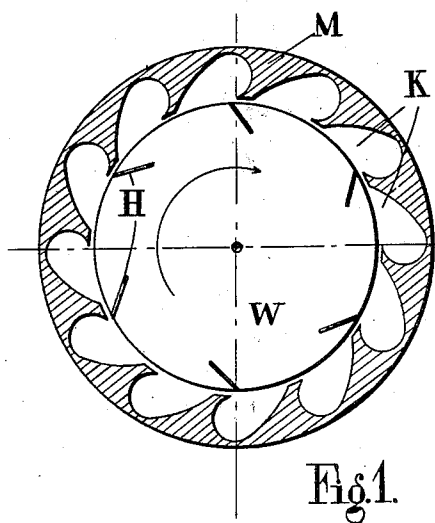


Fig. 1.

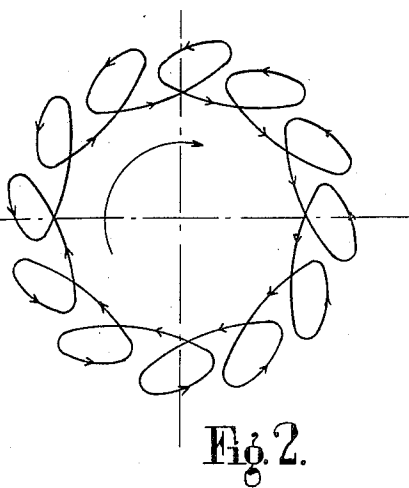


Fig. 2.

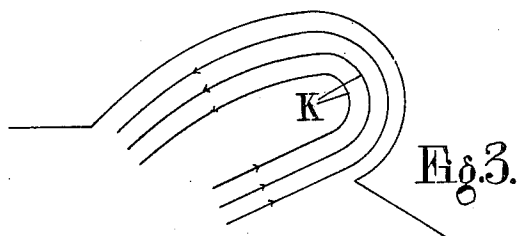


Fig. 3.

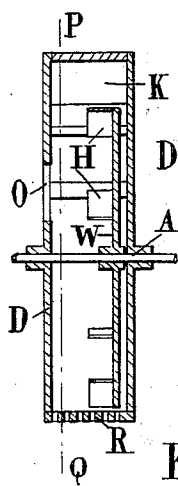


Fig. 4.

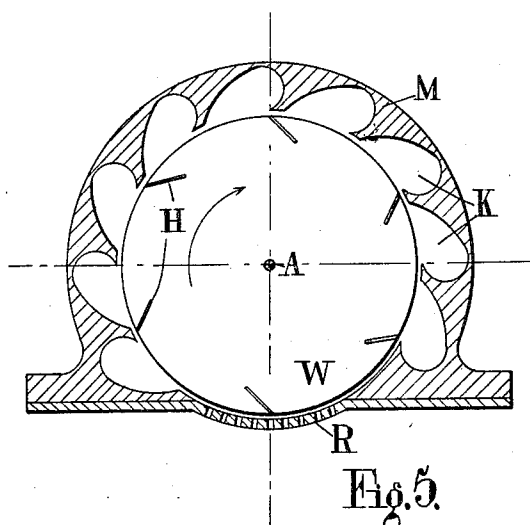


Fig. 5.

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MACHINE FOR TREATING MATERIALS

Application filed March 15, 1927, Serial No. 175,542, and in Germany February 1, 1926.

This invention relates to a new process for the disintegration of any materials, and more particularly of materials of any degree of hardness and of the most varied structure.

5 The essence of the new process consists in the fact that the material to be disintegrated is carried along by a current of air circulating in a succession of loops in a mill casing, and is disintegrated by the particles rubbing
10 against one another and against the walls of the mill casing, as well as by ventilation action of the circulating current of air.

For the carrying out of the new disintegrating process there serves a high-speed
15 centrifugal mill, with troughs or chambers which immediately succeed one another on the inside of the mill casing and are open towards the beater implements, and which are wider than the centrifugal disc together
20 with its fan blades or beater implements, so that the current of air sucked in by the centrifugal mill can circulate through the chambers one after the other without being disturbed by the beater implements revolving
25 past the chamber apertures.

By the new working process and the apparatus serving to carry it out it is possible to disintegrate effectually the most varied substances (soft, medium and hard substances), and substances of the most varied
30 structure, including fibrous and crystalline materials, in one and the same piece of apparatus, with a minimum expenditure of power.

The device for carrying out the new process is illustrated by way of example in the accompanying drawings.

Figure 1 is a diagrammatic transverse sectional elevation of a stationary drum.

40 Figure 2 a diagram representing the direction of flow of a current of air in the apparatus, and

Figure 3 a diagram representing on a larger scale the movement of material carried along by part of the current of air represented by Fig. 2.

45 If a stationary drum, in the interior of which there rotates at a definite velocity a disc provided with projections adapted to act as centrifugal fan blades, is provided on
50 its inner periphery with a series of cham-

bers, the mouths of which are wider, in a direction parallel to the axis of the disc, than the said projections a very important phenomenon is to be observed, namely: currents of air in the form of loops are produced in the chambers, and these currents convey the air particles from one chamber to the next.

This results in:

(1) A considerable air pressure in the chambers, and
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(2) A flow of the compressed air round the drum in the direction opposite to that in which the disc is rotating.

On the basis of the above phenomena a machine according to the invention can be constructed for carrying out the aforementioned purposes. Such a machine is illustrated by way of example in the accompanying drawings in a diagrammatic constructional form in Figures 4 and 5,
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Figure 4 being a longitudinal sectional elevation of the machine, and

Figure 5 a transverse sectional elevation thereof.
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This machine comprises a drum M closed at each end with a cover D, and having on its inner periphery, a series of chambers K, which are directed with their mouths in the direction of rotation of a disc W rotating concentrically within the drum M on a shaft A and provided with projecting beater implements having the shape of centrifugal fan blades H. The breadth of the blades H, in the axial direction of the drum M, is only about half the breadth of the mouths of the chambers K, so that the air which is being continually driven into the chambers K by the blades H can escape continuously from the said chambers beyond the outer lateral edges of the blades. Upon one part of the drum, preferably at the bottom, may be arranged a sieve grating R for the discharge of the material after treatment.

It would obviously be possible to arrange a plurality of drums and rotary discs on the same shaft A, whereby a machine working in a series of stages would be formed. In this case a number of different kinds of treatment could be carried out in one and the same
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machine, for example, the threshing in the chambers of one drum, the shelling or peeling in those of a second drum, the grinding in those of a third, and so forth; and according to the kind of work required not every drum would need to be provided with a sieve grating.

The machine works in the following manner:—

10 Before the material to be treated is introduced into the machine, which may be done for example through an aperture O in one of the end covers D, Fig. 4, the rotary disc W must be set in rotation, for the purpose of
15 producing the currents of air, which take the form of loops. Under the action of centrifugal force the material then fills the chambers K, where, under the influence of the air pressure, it flows round the drum in a looped path.
20 in the manner indicated in Fig. 3, and the individual particles of material rub themselves down one over the other and over the walls of the chamber, and during this movement in the form of loops (Fig. 3) are transferred
25 from one chamber to the next, the quantity of material transferred being dependent upon the shape of the chambers K.

It will be understood that although the loops are drawn in Figure 3 as if they were
30 lying in one plane there must in reality be a movement of the air and of the material carried thereby, while passing round each loop, in a direction parallel to the axis of the drum, out of the plane of the blades H into the
35 parallel plane or region P—Q, which is not occupied by blades.

The material that has been sufficiently treated escapes through the sieve grating R.

The rotating disc W should be arranged
40 near one end D of the drum M, with the blades H projecting laterally towards the opposite end, but not extending right across the drum, for it is to be observed that the work of the machine is done not in the plane of the pro-
45 jections H but in a plane P—Q, Fig. 4, lying between the free ends of the projections H and the opposite side D of the drum, and that if the length of the projections H were to be made equal to the breadth of the drum
50 M, the output of the machine would be practically zero.

What I claim is:—

Apparatus for the disintegration of any substances, and more particularly of sub-
55 stances of any degree of hardness and of the most varied constitution, comprising a centrifugal mill casing, a high-speed centrifugal disc rotatably mounted in said casing, blades adapted to act as centrifugal fan blades ex-
60 tending laterally from said disc, and chambers arranged in a continuous series round the inside of said casing, said chambers being formed with apertures facing said centrifugal disc, and the breadth of said apertures
65 in a direction parallel to the axis of the mill

being greater than the breadth of the disc together with the lateral blades secured thereto.

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

FELIX KUTASZEWICZ. 70

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