Aug. 31, 1937. F. VAN IMPE 2,091,536

CENTRIFUGAL DRIER

Filed Aug. 17, 1935

Fig. 1

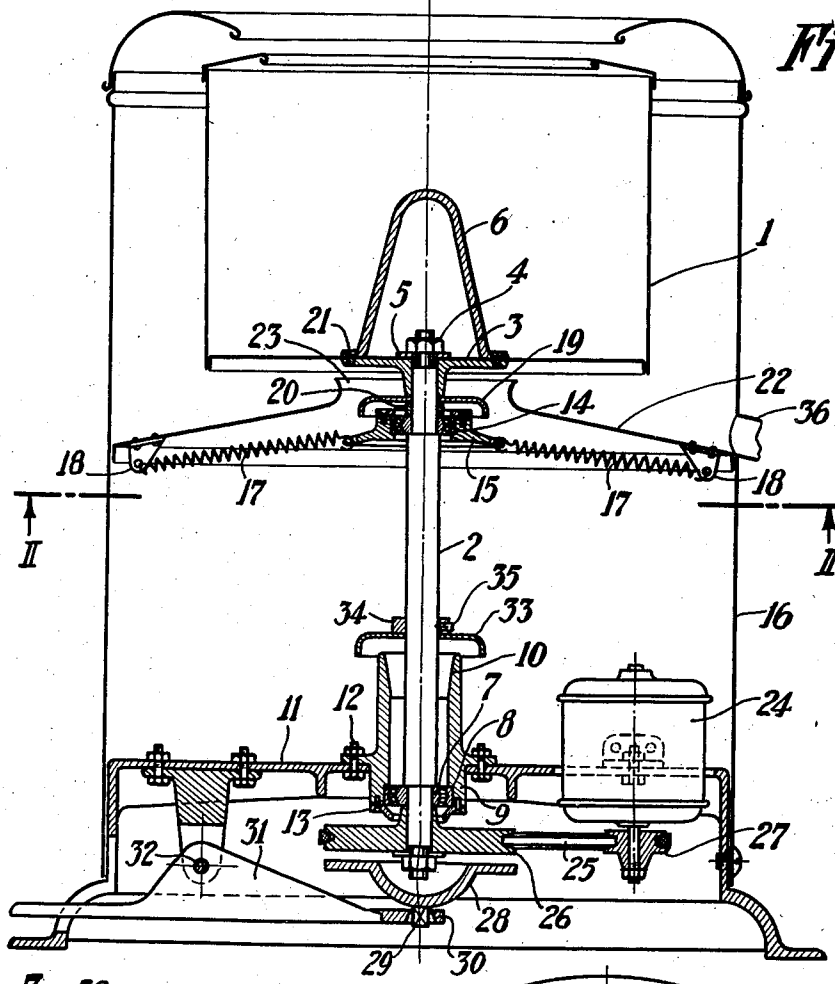


Fig. 3

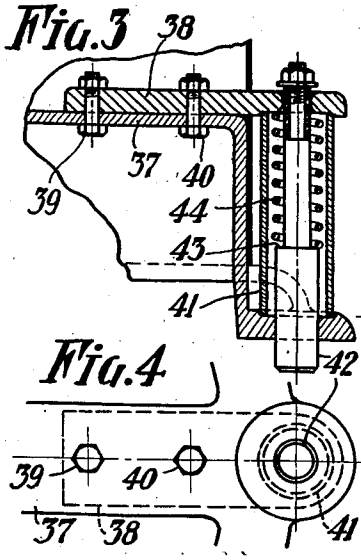
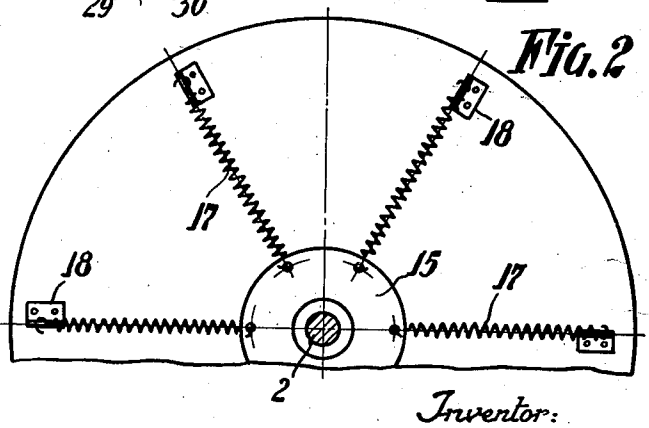


Fig. 4

Fig. 2



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Patented Aug. 31, 1937 2,091,536

UNITED STATES PATENT OFFICE

2,091,536

CENTRIFUGAL DRIER

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Application August 17, 1935, Serial No. 36,673
In Belgium November 30, 1934

1 Claim. (Cl. 210—71)

The present invention relates to centrifugal driers and has more particularly in view a new construction capable of securing to the machine a perfect working, independently of the distribution of the materials to be dried which have been introduced into the basket.

It is known indeed, that the extracting by centrifuging presents some practical difficulties, by reason of the irrregularity of the distribution of the masses to be dried within the rotary basket, from which result most considerable eccentric efforts, due to the speed of rotation itself required for the drying.

Palliatives have already been proposed, such as namely an elastic coupling between the rigid shaft and the basket itself, or furthermore the substitution for the rigid shaft of a relatively strong helical spring. These means have always for object to absorb the main portion of the eccentric efforts, and to bring the elements of rotation in a more or less complete equilibrium, so as to secure stability to the machine in movement.

The devices known at present present considerable advantages over the fixed device, whereas furthermore noticeable drawbacks subsist, the main one of which is the constant danger in the case of breakage of the proposed elastic means. Indeed, it is comprehensible that, in view of the great speed at which the extracting basket moves, such breakage would unavoidably cause serious consequences.

The present invention relates to an intermediary solution, in which the connection between the drying basket and the rotary shaft is kept rigid, whereas said shaft is capable of moving according to a duly conditioned whirling movement. For this purpose, it is mounted at the bottom in a ball-headed bearing, the outer socket of which is rigidly fixed in a convenient element. At the top, this same shaft is mounted in a second ball-headed bearing, the outer socket of which is fixed in an element elastically connected to fixed points of the outer casing of the machine. This elastic connection is embodied by the radial arrangement of a determined number of helical springs. In these conditions, the shaft and the drying basket to which it is firmly connected are capable of moving according to a combination of movements which result from a revolution about the properly so-called shaft, and from a revolution of the axis of the shaft around a virtual axis passing through the center of the machine.

Constructional details cooperate to a better working of such device and they will appear from the practical example described in detail hereafter and illustrated in the accompanying drawing, in which:

Fig. 1 is a vertical radial section, whereas

Fig. 2 is a plan view showing particularly the arrangement of the radial springs.

In this example and according to the invention, the drying machine thus comprises mainly an extracting basket 1, of known type, rigidly mounted upon the upper end of a rigid shaft 2. The connection of these two elements is obtained by the engagement upon the upper end of the shaft of a collar disc 3, upon which rests the corresponding portion of the bottom of the basket, which is thus firmly fixed by a nut 4 and a washer 5. For reasons of security, this nut will be locked by any means.

In the center of the basket 1 and on the portion of the bottom corresponding to the disc 3 is fixed a substantially conical bell 6 forming a protection for the fixation means of the shaft 2, and having moreover as a second function to secure a more dispersed arrangement of the materials to be dried within the basket.

At the bottom the shaft 2 is mounted in a ball-headed bearing 7. For this purpose, the bottom end of this shaft 2 is shouldered over, whereas the outer socket of the ball-headed bearing is fixed in a convenient casing 8 of a sleeve 9. The latter is profiled so as to receive, on the one hand, the outer socket 8 of the ball-headed bearing 7, and on the other hand to present upwardly an enlargement 10 for the purpose of conveniently restricting the movements of the shaft 2. The sleeve 9 is fixed in the base 11 of the machine by means of bolts 12 for instance.

By way of constructional characteristics, it is to be noted that the ball-headed bearing 7 may be very rapidly mounted and removed, by the fact of the provision of a removable underflange 13.

Upwardly, the shaft 2 is mounted in the ball-headed bearing 14, the outer socket of which is fixed in a ring 15 of convenient shape. The latter is connected to fixed points of the outer casing 16 of the machine by a number of helical springs 17, radially arranged. In fact, such springs are six in number and are uniformly stretched between the fixed points 18 of the machine and said ring 15.

Under these conditions, it will be understood that the latter may be moved laterally by stretching a number of springs 17 and compress-

ing in a corresponding manner the opposite springs.

The inner race of the ball-headed bearing 14 is engaged upon a shouldered portion of the shaft 2 and is strongly held in the required position by the upper nut 4, which has thus as multiple function to fix the drying basket 1, the inner ring of the ball-headed bearing 14 and, subsequently, a protection plate 19 rigidly fixed between the lower part of the disc 3 and an intermediary ring 20 resting against the ball-headed bearing 14.

The drying basket is capable of moving in the upper portion of the casing 16 which is limited downwardly by a bottom 22 having an inclined wall so as to direct the extracted waters precisely to the exhaust piping 36. This bottom 22 is moreover limited in its center by an opening 23, the size of which is determined in accordance with the maximum movement allowed to the rotary shaft 2. Moreover, the protection plate 19 will systematically prevent the drops of water which may spread between the bottom of the drying basket 1 and the bottom 22 of the exhaust chamber for the water, from falling upon the ball-headed bearing 14 and, as a consequence, deteriorate the latter.

The driving device comprises an electric motor 24, the rotary movement of which is transmitted to the rigid shaft 2 by means of a belt 25 having a trapezoidal section. For this purpose, the pulleys 26 and 27, respectively fixed upon the shaft 2 and upon the driving shaft 24, present also a trapezoidal groove.

The arrangement of the pulley 26 close to the bearing 7 presents the advantage that the transmission is secured independently of the positions taken by the rigid shaft 2, namely in its movements around the ball-headed bearing 7.

Finally, the machine is completed by a braking device, in fact constituted by a shoe 28 of wood for instance, and of which a downward nipple 29 of polygonal shape freely engages in a hole 30, of convenient section, provided at the end of a pedal moved lever 31. The latter can oscillate around a pivot 32 and can be brought back normally to its inoperative position under its own weight or by any elastic element. Preferably also, the opening 30 will have inner walls widening downwardly, so as to allow the shoe 28 to instantaneously follow the movement of the pulley 26 and thus become firmly applied against the lower face of the latter without producing eccentric efforts, which would be detrimental to the rational strain of the moving system.

The outer casing 16 is obviously profiled in any manner and connected to the base 11 of the machine by convenient means. Upwardly, this casing comprises a sufficiently great opening for introducing and removing the material to be dried and capable of receiving a closing cover of convenient shape and size.

Finally, it may also be provided accessorily to make the shaft 2 support a protection plate 33, fixed thereto by a sleeve 34 and a screw 35 for instance, and conveniently arranged over the sleeve 9 so as to protect the lower ball-headed bearing 7 against the introduction, through the widened opening 10, of all foreign bodies and of drops of water.

The drying machine being thus constructed, it may be easily understood that the moving elements will be moved in particularly favourable conditions, even when the distribution of the materials to be dried would be very irregular within the basket 1. Indeed, at starting, the radial helical springs 17 will absorb the eccentric efforts which will determine a more or less considerable whirling movement of the drying basket, such movement being progressively decreased when the machine reaches its normal speed, so as to reach finally a balanced position of a perfect stability.

The particularly simple braking device permits to produce a rapid arrest of the machine, and this without special wear upon the system in movement, by the fact that the shoe, generally of wood, instantaneously contacts with the lower face of the driven pulley, upon which the braking effort will thus be applied normally and instantaneously with the maximum force.

The centrifugal machine is capable of running in a practically perfect manner, as well at starting as in normal working and as in its braking phase.

Such device may obviously be used for drying machines of any type and for various uses, among which for instance the household driers for linen, for drying all fibrous materials, for separating solid bodies and liquid or viscous bodies and the like.

I claim:

A centrifugal drier comprising a base, an outer casing fixed to said base, a rotary extractor basket arranged within said casing, a central substantially vertical shaft supporting the basket, a sleeve fixed in the central open portion of the base and surrounding the shaft over a substantial length, said sleeve having its upper portion widened out, a bottom ball-headed bearing for said shaft mounted between the lower end of the sleeve and the shaft, a top ball-headed bearing for said shaft underneath the basket, a ring-like member in which is mounted this last-mentioned bearing, radially arranged helical springs connecting said ring-like member to the inner wall of the casing, a grooved pulley fixed to the lower end of the shaft close against the bottom ball-headed bearing, a motor fixed to the base, a belt transmission between the pulley and the motor, and a braking device comprising a disc engaging said pulley in the axial direction, a pivoted operating lever for said disc and a freely swinging connection between the disc and its operating lever.

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