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CENTRIFUGAL MACHINE

Filed June 14, 1932

Fig. 1.

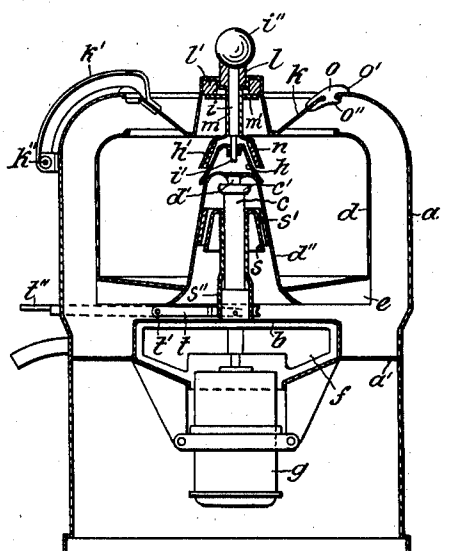


Fig. 3.

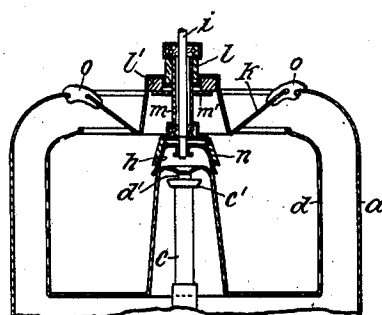


Fig. 4.

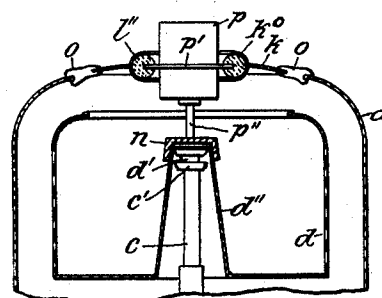


Fig. 2.

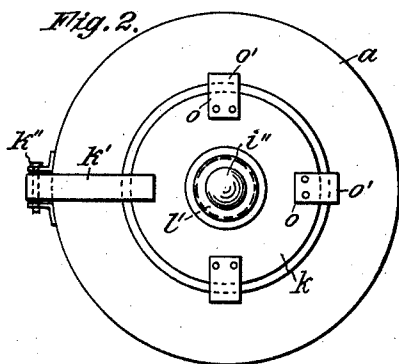
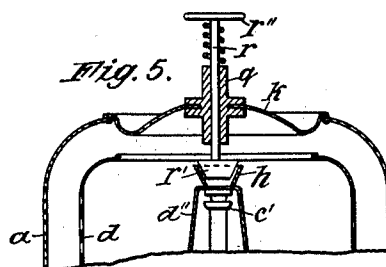


Fig. 5.



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UNITED STATES PATENT OFFICE

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CENTRIFUGAL MACHINE

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Application June 14, 1932, Serial No. 617,216

In Germany June 18, 1931

9 Claims. (Cl. 210-71)

I have filed applications as follows: Germany June 18, 1931, Poland Feb. 25, 1932.

This invention relates to improvements in centrifugal machines of the type intended for uniform charges, especially with linen, and it comprises, in combination with the shell of the machine, a centrifugal drum so supported and suspended in a shell as to be capable of assuming an oblique position in any direction. If in the driving of such a centrifugal machine the normal number of revolutions is surpassed, or if a more powerful motor has been built in, or if the drum is being rotated while being empty, or if the machine is subjected to over-stresses, or if an excess of load is on one side of the drum, a critical number of revolutions may arise at which the lateral deflections of the drum axle in the circular path which it describes become too large and its circular motion may be finally transmitted to the shell, setting up strong vibrations. It might be possible to limit the deflections of the drum by means of brake rings provided inside the shell, but nevertheless the shell is subject to violent shocks produced by the contacts of the drum.

The object of the present improvement is to prevent too strong deflections of the drum axis, especially at critical numbers of revolutions, by yieldingly restraining the movement of the drum transversely to its axis of rotation, or in its radial plane respectively. This yielding guidance takes place preferably in the centre of the drum and the means therefor may consist, for instance, of a friction ring attached to, or inserted into, the cover together with a buffer formed, for instance, by a rubber ring, there being left a certain gap permitting the drum a corresponding play so that said rings come into action only after this play has been surpassed, the rings acting then as brakes to reduce the number of the revolutions of the drum. It is, however, also possible to obviate said play and guide the drum by means of a suitably inserted pivot bearing held yieldingly at the shell cover. When making use of this constructional form it is suited to the purpose in view to suspend also the cover at the shell in such a manner that it can yield radially, as well as axially, whereby the oscillations unavoidably produced by the revolutions of the drum are modified on the one hand at the yielding guide member and on the other hand at the yielding staying member of the cover, in consequence whereof the machine runs exteriorly completely quiet.

The invention is illustrated diagrammatically and by way of example on the accompanying drawing on which Figure 1 is an axial section

through an improved centrifugal machine designed according to this invention. Figure 2 is a plan of this machine, and Figures 3, 4, and 5 show three different modifications, these figures illustrating, however, only the upper halves of the machine, the lower halves being omitted, because they, in general, correspond with the lower half of the constructional form shown in Fig. 1.

Referring to Fig. 1, *a* denotes the shell of the machine and *a'* is a bottom, from the centre portion of which rises an elevation *b* supporting in its centre a column *c* carrying on its top a bearing pan *c'* for the rounded pivot bearing *d'* of the drum *d*. Below the elevation *b* is suspended from the bottom *a'* the motor *g* which drives a fan *f* located in the elevation *b* and producing air currents by which the drum *d* is rotated by the intermediary of blades *e* projecting forth downwardly from said drum. The elevation *b* has large perforations through which the currents of air find access to said blades *e*.

Centrally in the cover *k* of the shell is arranged a vertical shaft *i*, the lower end of which forms a pivot *i'*. The cover *k* is of particular transverse sectional shape, forming, as it were, a deep and large circular groove, and its practically cylindrical centre portion projects a little above the horizontal plane of its circumferential edge. Said cylindrical centre portion is closed at its top, and in this top portion has a square hole through which extends the likewise square upper end of the shaft *i*. This latter extends, furthermore, through a sleeve *m*, the upper end of which is connected with a disk *m'*. This disk supports a rubber ring *l'* arranged in the top of the cylindrical centre portion of the cover, and into said ring *l'* extends a rubber sleeve *l* surrounding the uppermost end of the shaft *i*. Above this sleeve a ball-shaped (or similarly shaped) member or knob *i''* is attached to the said shaft *i*.

The sleeve *m* is at its lower end connected with a hollow conical member *h'* provided with an internal friction covering or lining *n*, and the pivot *i'* of said shaft extends into a hollow conical member *h* extending in turn into said first-mentioned conical member *h'*, *n*. Between the two hollow conical members a certain gap or play is left.

The rim of the cover *k* might lie directly upon the rim of the shell *a*, but I prefer to support the cover upon the shell in a yielding manner, especially by the provision of holding arms *o* consisting of a yieldable material, as for instance upper rubber claws *o'* and lower projections *o''*, the arrangement of these claws and projections

being such that the cover is retained in its place with a certain tension which must be overcome in order to insert the cover or to remove it.

In the example shown in Fig. 1 the cover is 5 firmly connected with an arm k' hinged at k'' to the shell.

Concerning the action and effect of the arrangement and combination of the parts described it is sufficient if either the braking members h' , n and h or the pivot i' has been provided, but, preferably both these contrivances are used. If only the first-mentioned members are made use of, the drum d can freely oscillate laterally upon its bearing pan c' as much as the play 10 between the two conical members h and h' , including the friction covering n , permits. If the lateral deviation becomes too large either by the critical number of revolutions having been reached or by reason of the change in the drum 15 being very ununiform, especially if too much linen is on one side of the drum, or from any other reason, the braking action takes place between the conical member h and the friction covering n of the conical member h' which latter 20 members (n and h') can give way in a certain measure owing to the provision of the rubber members l and l' .

If the lateral deviations of the drum should become larger, said rubber members present correspondingly more resistance so that the surpassing 30 of the certain permissible number of revolutions or too strong lateral deviations of the drum can with certainty be obviated.

If, besides, the members h , h' and n , also the 35 pivot i' has been provided, and if this pivot fits approximately correctly into the bore provided for it in the top of the member h , the checking action of the rubber rings l and l' will take place instantly when the lateral deviations of the drum 40 commence, that is to say, when the axis of the drum commences to leave its proper vertical position. The friction covering n can then also be used for braking by hand, in that a certain pressure is exerted upon the knob i'' so as to depress the shaft i , the sleeve m and the members 45 h' and n as much as the rubber rings l and l' permit, whereby the friction covering n will be pressed with a corresponding power upon the member h .

The yielding guide members described can be 50 used also as means for transmitting the driving power to the drum. A constructional form of this kind is shown in Fig. 3, in which the shaft i extends outwardly through the rubber ring l and the hollow conical member n engages the conical 55 member h forming the top of the central portion of the drum. The shaft i is driven by any suitable motor, may be, by the intermediary of a belt or the like. Any oscillations of the drum 60 are taken up by the yielding guide members, viz. the rubber rings l and l' .

It is also possible to support the driving motor in a yielding manner, for which an example is given in Fig. 4. The motor p is in this case surrounded with a flange p' which engages a rubber 65 ring l'' held in the groove-shaped rim k'' of the cover k of the shell a . The motor shaft p'' extends downwardly and is at its end provided with the hollow conical member n which engages the 70 top of the central portion d'' of the drum, as in Fig. 3. As the rubber ring l'' is a yielding member, lateral oscillations of the drum and of the motor are rendered possible without any detrimental consequence. A small gap may be left 75

between the top of the central drum portion d'' and the conical transmission member n .

Instead of this latter member friction disks might be used, one attached to the shaft p'' as 80 a substitute for said conical transmission member n and the other attached to the central drum portion d'' , and furthermore, instead of the transmission by friction cog-wheel transmission might be provided.

In the further example illustrated in Fig. 5 the 85 conical members h and r' are intended for use as braking members if the lateral deviations of the drum should become too great. The hollow conical brake member h is secured to the central drum portion d'' and the inverted solid cone r' 90 is affixed to the lower end of the vertically movable rod r which is located in, and guided by, the sleeve q that consists of a yielding material, especially rubber, and is located in the centre of the cover k . On the top of the rod r is a disk 95 r'' for depressing the rod. A certain gap providing for a little play is left between the members h and r' , the member r' being normally held in this position by a helical compression spring, as shown. When the disk r'' is depressed, the friction 100 member r' engages the friction member h whereby the braking is initiated. If the members h and r' are in their normal position and if then the deviations of the drum become greater than admissible, the braking members operate 105 automatically, in that the member h takes part in the deviation and comes, therefore, in contact with the member r' , as will be clear without a more detailed description.

Braking the drum can be effected also from 110 the interior of the central portion thereof, for instance by means of two conical friction members s and s' , of which the first is affixed to the sleeve s'' , that surrounds the driving shaft c and the other is secured to the inner surface of said 115 central drum portion d'' . The lower end of said sleeve is connected with a double-armed lever t t'' fulcrumed at t' whereby the sleeve can be lifted and the friction member s can be lifted and pressed into the friction member s' . 120

I claim:

1. In a centrifugal machine, in combination, a drum, a central cup-shaped portion extending 125 upwardly from the bottom of the drum, a bearing for the cup shaped portion admitting lateral movement to said drum, means independent of the drum engageable with the said central cup-shaped portion for restraining oscillations of said drum beyond a certain extent.

2. In a centrifugal machine, in combination, a 130 drum, a central cup-shaped portion extending upwardly from the bottom of the drum, a bearing for the last mentioned member admitting lateral movement to said drum, independently arranged means adapted to engage said central 135 cup-shaped portion for restraining oscillations of said drum beyond a certain extent, said means being spaced from the central portion for permitting some play between themselves and said central portion. 140

3. In a centrifugal machine, in combination, a drum, a central cup-shaped portion extending 145 upwardly from the bottom of the drum, a journal bearing for said cup-shaped portion admitting lateral movement to said drum, a cover for the machine, means yieldingly arranged in said cover and operative to engage said central portion for restraining oscillations of said drum beyond a certain extent.

4. In a centrifugal machine, in combination, a 150

- drum, a central cup-shaped portion extending upwardly from the bottom of said drum, a journal bearing for the said central portion admitting lateral movement to said drum, a cover for the machine, means yieldingly arranged in said cover operative to engage said central portion for restraining oscillations of said drums beyond a certain extent, said means leaving some play between themselves and said central portion. 80
5. In a centrifugal machine, in combination, a drum, a central cup-shaped portion extending upwardly from the bottom of said drum, a bearing for the last mentioned element admitting lateral movement to said drum, independently arranged means adapted to engage said central portion for restraining oscillations of said drum beyond a certain extent, said means leaving some play between themselves and said central portion being axially movable with relation to said central portion. 85
6. In a centrifugal machine, in combination, a drum, a central cup-shaped portion extending upwardly from the bottom of said drum, a bearing therefor admitting lateral movement to said drum, a cover for the machine, independently arranged means adapted to engage said central portion for restraining oscillations of said drum beyond a certain extent, said means leaving some play between themselves and said central portion and being axially movable in the cover of the machine against yielding pressure with relation to said central portion. 90
7. In a centrifugal machine, in combination, a drum, a central cup-shaped portion extending upwardly from the bottom of said drum, a bearing therefor admitting lateral movement to said drum, a cover for the machine, means yieldingly arranged in the cover and adapted to engage said central portion for restraining oscillations of said drum beyond a certain extent, said means being journaled in said cover, and a motor connected to said means for driving it and said drum. 95
8. In a centrifugal drier, a rotary container having a member extending upwardly from the bottom and centrally disposed thereof, an upwardly extending support for said container, said support engaging said member whereby said container is mounted upon said support for tilting movement in all directions, driving means for said container, and a brake comprising cooperating parts secured respectively to said container and said support whereby the brake is operated by the movement of the container away from its axis under the influence of centrifugal force caused by unbalanced loading of the container. 100
9. In a centrifugal machine, in combination, a drum, a central cup-shaped portion extending upwardly from the bottom of the drum, a bearing for the last mentioned member admitting lateral movement of said drum, means independently of the drum and located above the cup-shaped portion engageable by the said cup-shaped portion for restraining oscillations of said drum beyond a predetermined extent. 105

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