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CLOTHES SPINNER

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Our invention relates to centrifuge or spin-type clothes driers and it has particular relation to means for safeguarding the operator of drying equipment of this type.

5 A spin-type drier typically comprises a perforated clothes receiving container which is arranged to be rotated, as by a suitable driving motor. This rotation sets up centrifugal forces which, acting upon the drops of moisture in the clothes, throw them outwardly through the perforations.

10 In a conventional arrangement which has proved especially successful for domestic application, the perforated container is vertically mounted inside of an outer shell or casing through an opening in the top of which the clothes are introduced into and removed from the container. Control of the container rotation may be effected by manipulation of the usual motor control switch.

15 Inasmuch as serious injury may result if the operator inadvertently contacts the container while it is rotating at its relatively high operating speed, there is a distinct need for safeguarding means for driers of the above-described and other equivalent types. It is to the provision of such means that our invention is directed.

20 Generally stated, the object of our invention is to provide means whereby access to the interior of the spin drier can be had only when the container is at rest.

25 A more specific object of our invention is to provide means whereby the driving motor can be energized to rotate the container only when the opening in the outer casing is closed as by a suitable lid or cover.

30 Another object of our invention is to provide means whereby a movement of the cover from the latched to the released position deenergizes the motor and causes the rotating container to rapidly come to a stop.

35 A further object of our invention is to provide means whereby removal of the cover can be effected only after the speed of the spinner has dropped to an exceedingly low and completely non-dangerous value.

40 Our invention itself, together with additional objects and advantages thereof, will best be understood through the following description of a specific embodiment when taken in conjunction with the accompanying drawing, in which:

45 Figure 1 is a side view, in sectional elevation, of a spin type drier to which the safety expedients of our invention are shown as being applied;

Fig. 2 is a top plan view, partially in section, of the drier and safety devices of Fig. 1;

Fig. 3 is an enlarged showing of certain details of the flexible mounting for the rotatable container of the drier;

Fig. 4 is a schematic view showing the retarding brake and safety switch assembly devices of our invention, and

Fig. 5 is a diagram illustrating a preferred manner in which the electrical devices comprised 10 by the equipment shown in the preceding figures are interconnected to effect the desired safety features.

Referring to the drawing, and particularly to Figs. 1 and 2 thereof, the spin type drier there 15 illustrated comprises a clothes receiving container 10 mounted inside of an outer shell 12 and arranged to be driven through a vertical supporting shaft 14 by means of an electric motor 16. The container 10 is provided with perfora- 20 tions 18 in the sides thereof, through which perforations the moisture contained in articles of clothing placed therein is expelled under the influence of centrifugal force induced by rotation of the container. This expelled water escapes 25 from the outer casing 12 through a drain connection 20 in the bottom thereof.

In the particular driving connection illustrated, the motor 16 carries on its shaft 22 a small pulley 23, over which a belt 24 runs to drive, at 30 a considerably reduced speed, a larger pulley 25 carried by the vertical shaft 14, to the upper end of which the perforated container is fixed.

In order that the rotating assemblage may be allowed freedom of movement to take care of 35 the oscillations which are present, particularly as it passes through the so-called critical speed, this assemblage, together with its driving mechanism, is supported from a stationary plate member 28, by means of resilient coil springs 29 40 and 30. This plate member is supported from the structure of the outer casing 12 and one end of each of the named springs is secured to it. The other end of spring 29 terminates in a fixture attached to the motor mounting plate 32, 45 while the other end of spring 30 similarly is fixed to a bearing member 34. As is more clearly shown in Fig. 3, there may be incorporated in the member 34 a ball bearing which allows free rotation of a cooperating member 36 which is 50 fixed to the lower portion of the spinner 10.

In the top of the outer casing member 12 is a centrally positioned opening through which the clothes or articles to be dried are introduced into the perforated container 10. As before point- 55

of flexible mechanical control connection is found to be especially satisfactory.

In the operation of spin type driers of the type under consideration, it is found that due to the stored energy in the rapidly rotating perforated container and its charge of clothing, a considerable time is required before the container comes to rest after interruption of the driving motor circuit. To quicken the deceleration after circuit interruption, we provide braking means shown in the drawing in the form of a drum member 76 fixed to the lower end of the container shaft 14, which drum member is encircled by a pair of brake bands 78 normally biased to the contacting or braking position by means of the springs 74 and 75. These bands are controlled by the movement of safety device actuating lever 72 in such manner that the movements effected by rotating the spinner cover 38 to the latched position releases the brake and thereby allows the perforated container to freely rotate. However, when the spinner cover is rotated back to the removable or unlatched position, in which, as has been before pointed out, the safety switch 58 is biased to the open position, the brake is automatically applied and functions to rapidly bring the rotating container to a standstill.

As supplemental to the safety devices just described, which in themselves are of great advantage, we further provide means which make it impossible for the operator to remove the spinner cover before the perforated container has been slowed down to a completely non-dangerous speed. One preferred form of such means comprises a pair of magnet-type locking devices 80 which are controlled by means of a centrifugal switch 82 which is responsive to the container speed. Each of these locking devices comprises a pin member 81 which, when moved inwardly by the attraction of an armature member 83 to an electromagnet 84, fits into a slot 86 in the downwardly projecting rim of the cover 38, and thereby makes it impossible to lift the cover from the spinner even though the cover is rotated to the unlatched position. The length of these slots 86 is such that the desired latching and unlatching rotational movements of the cover are in no way interfered with.

In the arrangement shown, the centrifugal switch is mounted on an extension of the driving motor shaft 22 and functions, as is diagrammatically indicated in Fig. 5, to effect the closure of a pair of contact members 88 when the motor speed rises above a predetermined value. As long as the speed remains below this value, a spring 99 biases these contact members to the open position, and thereby allows the compression springs 91 of the magnetic latches to withdraw the pins 81 from the operating notches in the cover rim.

Closure of the centrifugal switch contact members 88 is arranged to take place as soon as the perforated container speed has attained an appreciable value, say, of the order of 100 revolutions per minute. This closure completes an energizing circuit for the magnets 84 which may be traced from the upper supply conductor 56 through the switch contact members 88, conductor 93, the two magnet windings 84, and conductor 94, back to the lower power source conductor 56. Thus energized the magnets draw the two locking pins 81 into the cover slots and effectively prevent its removal until such time as the speed of the perforated container has been reduced below the dangerous value named.

It will be apparent that, by mounting the centrifugal switch 82 on the higher speed motor shaft, a much more sensitive control can be obtained than would be possible by mounting the switch directly upon the rotating container shaft 14. This especially in view of the fact that the majority of centrifugal switches now commercially available require relatively high speeds for their operation.

In the particular application under present consideration, in which it may be assumed that the speed reduction in the belt drive between the motor and the perforated container shaft is of the order of 10 to 1, the switch 82 when sensitive to speeds in excess of 600 revolutions per minute, actuates at speeds of the spinner as low as 60 revolutions per minute. In the event that the spinner was provided with a slow speed motor adapted to directly drive the perforated container, the centrifugal switch could be supplied with its own individual speed-increasing drive to attain the higher sensitivity mentioned.

It will be apparent that, through the provision of the above described safety expedients of our invention, we have rendered it impossible for an operator to make contact with the rotatable perforated clothes container while the same is rotating at a speed above a given low or completely non-dangerous value. We furthermore have rendered the control of the spinner automatic in accordance with the latching and unlatching of the spinner cover and thereby have eliminated the necessity for the operator to actuate one or the other of the two externally positioned motor control switches except at the beginning and at the end of the spinner use periods. In addition, we have minimized the time required for the spinner to come to rest, and have thereby greatly increased the capacity of the apparatus during normal operation in which a large number of clothes changes are required.

Although we have shown and described certain specific embodiments of our invention, we are fully aware that many modifications thereof are possible. Our invention, therefore, is not to be restricted, except insofar as is necessitated by the prior art and by the scope of the appended claims.

We claim as our invention:

1. In a spin-type clothes drier comprising a container, driving means for rotating said container, and an outer casing having a circular opening through which access to the container may be gained, the combination of a removable circular cover for said opening, means whereby a turning of the cover, when in place over the opening, in one direction will effect a latching thereof and a turning in the reverse direction will effect a release thereof, and means actuated by said cover turning movements for making effective said driving means only when the cover is turned to the latched position.
2. In a spin-type clothes drier comprising a container, driving means for rotating said container, and an outer casing having a circular opening through which access to the container may be gained, the combination of a removable circular cover for said opening, means whereby a turning of the cover, when in place over the opening, in one direction will effect a latching thereof and a turning in the reverse direction will effect a release thereof, braking means for rapidly stopping said container, and means actuated by said cover turning movements for mak-

ing effective said braking means only when the cover is turned to the released position.

3. In a spin-type clothes drier comprising a container, driving means for rotating said container, and an outer casing having a circular opening through which access to the container may be gained, the combination of a removable circular cover for said opening, means whereby a turning of the cover, when in place over the opening, in one direction will effect a latching thereof and a turning in the reverse direction will effect a release thereof, means for preventing a removal of said cover, and means responsive to the speed of rotation of said container for rendering effective said removal preventing means as long as said speed is maintained above a given value.

4. In a spin-type clothes drier comprising a container, driving means for rotating said container, an outer casing having a circular opening through which access to the container may be gained, and means for flexibly supporting said container and its driving means in said outer casing to permit of a change of position therebetween, the combination of a removable circular cover for said opening, means whereby a turning of the cover effects a latching and unlatching

thereof, safety devices mounted upon said container driving assemblage, and means for transmitting the latching and unlatching movement of said cover to said safety devices to effect actuation thereof.

5. In a spin-type clothes drier comprising a container, driving means for rotating said container, an outer casing having a circular opening through which access to the container may be gained, and means for flexibly supporting said container and its driving means in said outer casing to permit of a change of position therebetween, the combination of a removable circular cover for said opening, means whereby a turning of the cover effects a latching and unlatching thereof, safety devices mounted upon said container driving assemblage, and means for transmitting the latching and unlatching movement of said cover to said safety devices to effect actuation thereof, said transmitting means comprising a flexible wire which is moved through a laterally unyielding surrounding sheath secured at its respective ends to the stationary casing and to the container driving assemblage.

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ELECTROLYTIC TREATMENT OF LIQUIDS

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2 Sheets-Sheet 1



