June 26, 1934. C. E. WAREAM 1,964,144

SAFETY LOCK FOR ROTATING CYLINDERS

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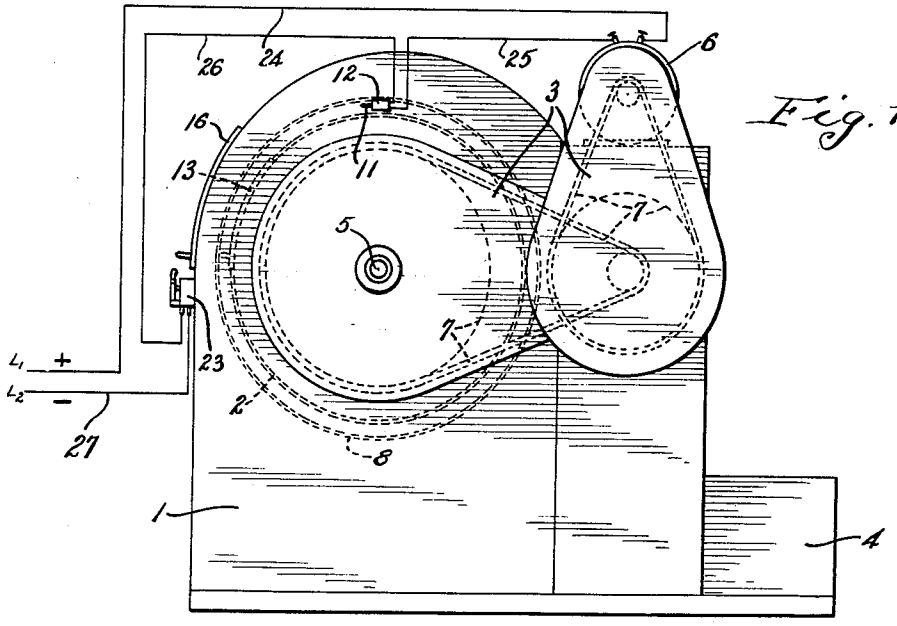


Fig. 1.

Fig. 2.

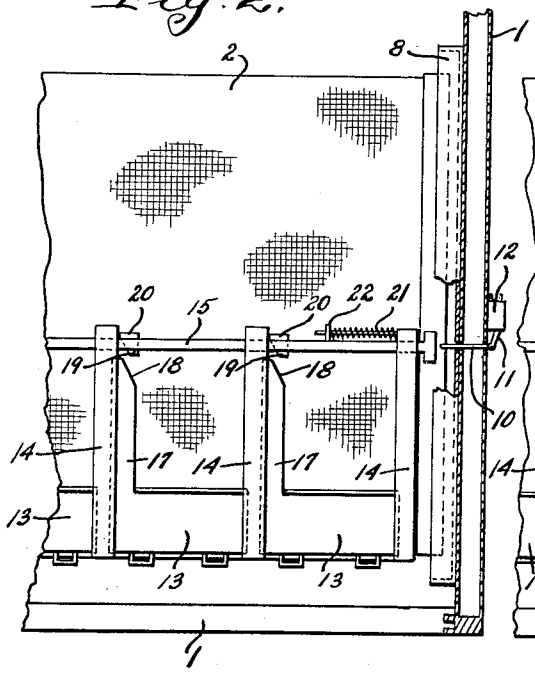
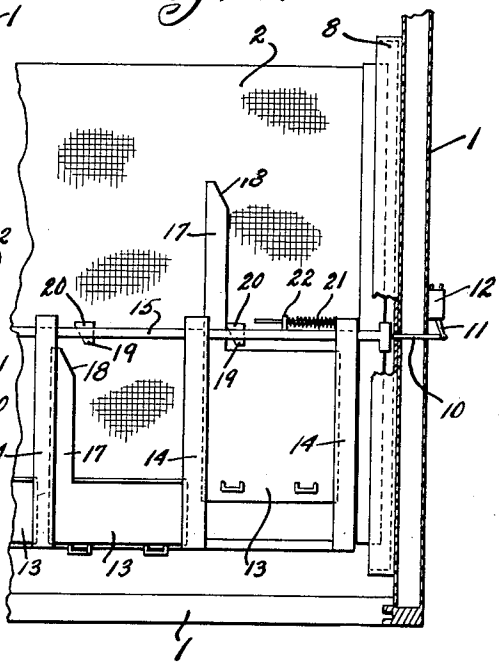


Fig. 3.



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SAFETY LOCK FOR ROTATING CYLINDERS

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3 Claims. (Cl. 192—136)

My invention relates to a safety lock for rotating cylinders of apparatus of the drum and cylinder type wherein a rotating cylinder is contained by an outer shell or drum, and particularly, to a safety locking means for the rotating cylinders of drying tumblers, washing machines and the like, the object of the invention being to so construct and arrange the parts of the apparatus that the driving means for the cylinder will be automatically rendered ineffective to rotate the cylinder when the cylinder doors, or any one cylinder door, are in open position and will not be again rendered effective for driving the cylinder until such doors, or door, are closed, thus preventing the operation of the cylinder at a time when serious damage might result therefrom.

The construction of the apparatus embodying my invention is inexpensive, effective, and durable and consists of mounting a sliding bar to intersect the path of all of the doors of the cylinder, the bar being normally yieldingly held in one direction longitudinally by suitable means to permit actuation of the driving means and each door being provided with means whereby, when the cylinder doors are aligned with the outer drum doors, if any one door is left open to an extent which would allow the contents of the cylinder to spill or extend outwardly of the cylinder during rotation thereof the bar will be actuated, to effectively cut off operation of the driving mechanism.

Various other objects and advantageous features of my invention may be seen in the following description and one embodiment thereof may be seen in the accompanying drawing wherein similar characters of reference designate corresponding parts and wherein

Fig. 1 is an end view of an apparatus including a cylinder and equipped with one embodiment of my invention; Fig. 2 is a fragmentary plan view showing the casing and cylinder of a drying tumbler, washing machine or the like equipped with a safety lock constructed in accordance with my invention, and showing the cylinder doors in closed position; and Fig. 3 is a view similar to Fig. 2, but showing one of the cylinder doors in open position wherein the driving mechanism cut-off means which forms a safety lock is operated to render the driving mechanism ineffective.

Referring to the drawing, I have shown what may be a washing machine, drying tumbler or the like, comprising a casing 1 having a cylinder 2 rotatably mounted therein, the casing 1 acting as a support for gear housings 3 and, in this instance, an outlet duct 4. The cylinder 2 is rigidly mounted on a shaft 5 which is rotated by a motor 6 through connecting gearing and belts 7 in the housings 3.

As shown, a circular reenforcing angle 8, concentric with the shaft 5 is rigidly mounted on the inner wall of the casing 1 to provide a more substantial structure and to form a support for delinting screens. The outer and inner walls of the casing 1 as well as the angle 8 are provided with concentric perforations through which a pin 10 slides loosely, the outer end of the pin 10 being pivotally connected to the protruding end of the operating lever 11 of a switch structure 12 secured to the outer wall of the casing 1. The switch is normally yieldingly held in closed position which is, as shown in Fig. 2, with the free end of the operating lever 11 in its left-hand position.

As is customary, the cylinder 2 is provided with a plurality of arcuate doors 13 arranged in a line parallel to the longitudinal axis of the cylinder and arranged to slide circumferentially in guides 14 secured to the cylinder body, the doors being so arranged that, when in closed position, they cover openings in the cylinder slightly smaller than the doors and, when in open position, they uncover such openings. Therefore, the guides 14 must be substantially twice the length of the doors to guide the doors throughout the entire movement for covering or uncovering the openings in the cylinder.

The upper or back end of each of the guides 14 is provided with an opening through which a bar 15 extends and through which openings the bar 15 is free to move longitudinally. As shown in Fig. 2, when the doors 13 are in closed position, considering the cylinder door openings as being in loading or unloading alignment with the drum door opening or openings the right-hand end of the bar 15 terminates a short distance to the left of the left-hand end of pin 10 when such pin is in its left-hand position, whereby the cylinder 2 carrying the bar 15 is free to rotate without any interference from the pin 10.

The pin 10 is so located with respect to the location of the bar 15 that the two will register when the cylinder 2 is in loading or unloading position, that is, with the doors 13 of the cylinder registering with the doors 16 provided in the casing 1. Usually, suitable means are provided for what is known as "spotting" the cylinder 2 in a position in which the doors 13 and 16 will register. When the door openings of cylinder 2 are placed in loading or unloading

position and the bar 15 is moved to the right as shown in Figs. 2 and 3 by opening a cylinder door or doors, the free end of the bar 15 will contact with and move the pin 10 to the right and, it follows that the switch operating arm 11 will also be swung to the right which will, according to the arrangement of the switch, move the switch to open or off position to produce a break in a circuit line to an electric motor or drive unit as hereinafter described. Reversely, when the bar 15 is moved to the left from the position shown in Fig. 3, it will move away from the end of the pin 10 and permit the switch 12 to be moved to closed or on position by some suitable means and thus complete a line to the electric motor or drive unit, such as a spring (not shown).

In the embodiment shown, the bar 15 is moved to the right from the position shown in Fig. 2 by opening any one or all of the doors 13. This is accomplished by providing an arm or projection 17 rigid with each door 13 and extending a considerable distance above or back of the top or back edge of the doors, the arms 17 having beveled end edges 18 adapted to coact with beveled end edges 19 on blocks 20 rigidly mounted on the bar 15, with a block 20 being disposed adjacent each of the arms 17. The arms 17 are of such length and so positioned relative to the blocks 20 that even slight opening movement of the doors 13 will cause the bar 15 to be moved to the right, as shown in Figs. 2 and 3, which will be effective to move the switch 12 to open or off position as hereinbefore described.

Resilient means are provided for resisting movement of the bar 15 to the right, as shown in Figs. 2 and 3, and for returning such bar to the left automatically when the doors 13 are closed. This means consists of a spring 21 disposed between an abutment 22 secured to the rod 15 and the uppermost end of one of the guides 14. With this construction, it will be seen that movement of any one of the doors 13 to open position will be effective to move the bar 15 to the right and the switch 12 to open or off position against the resistance of the spring 21 when the cylinder doors are in loading or unloading position in the drum and, reversely, complete closure of all of the doors 13 will permit the spring 21 to move the bar 15 to the left with the blocks 20 striking the guides 14 and acting as stops, whereby the switch 12 may be moved to closed or on position by some suitable means, such as a spring. As will be noted, the length of the arm 17 is such that the doors 13 must be in substantially complete closed position before the bar 15 may move to the left.

Referring to Fig. 1, I have diagrammatically illustrated an electrical circuit leading to the motor 6 from a source of supply and including a manually operable starting switch 23. In the operation of the apparatus, assuming that the starting switch 23 has been moved manually to on position and the cylinder doors 13 are all in closed position, which will permit the switch 12 to be in closed or on position, current flows from L1 through the line 24 to the motor 6, thence through line 25, switch 12, line 26, manually operated starting switch 23 and line 27 to L2, this being effective to operate the motor. Rotation of the cylinder may be controlled by the starting switch 23 until the cylinder doors 13 are brought into registry with the casing doors 16, cylinder rotation stopped, and any one or all of the cylinder doors 13 opened, whereupon the circuit just described will be broken by movement of the switch 12 to open or off position which will be effective to prevent further operation of the motor 6 under control of the starting switch 23 and through the circuit just described until the cylinder doors are closed and the switch 12 again assumes its closed or on position.

With the above construction, I have provided a safety lock for rotating cylinders which embodies the highly advantageous feature of positively preventing operation of the cylinder by the power means when the cylinder doors are open by effectively cutting off automatically the supply of power to the power means and, while this embodiment is directed to an electrical power means including a circuit which is broken by the opening of any one or all of the cylinder doors, it will be understood that my invention is not limited thereto but with minor changes is equally applicable to steam, air, or other power operated devices.

What I claim is:—

1. In apparatus of the class described comprising cooperative drum and rotatable cylinder parts, having registerable openings and doors therefor, a motor for rotating said cylinder, and means for rendering said motor ineffective upon said cylinder when said openings are in registry unless said cylinder door be closed, said control means including parts on said door, said cylinder, and said drum respectively, arranged to be cooperative when said openings are in registry.

2. In apparatus of the character described and comprising a drum and a cylinder rotatable therewithin, said parts having openings registerable to permit loading of said cylinder and doors for said openings, power means for rotating said cylinder and control means for said power means, said control means including a switch secured with said drum, an actuator for said switch mounted on said cylinder to be cooperative with said switch when said openings are in registry, and means associating said cylinder door with said actuator for controlling the latter by the former, the parts being so proportioned and arranged that when said openings are in registry said switch will be opened to prevent energization of said cylinder except when said cylinder door is closed.

3. In apparatus of the character described and comprising a drum and a cylinder rotatable therewithin, one of said parts having a plurality of aligned openings and the other having a corresponding set of openings registerable therewith to permit loading of said cylinder, doors for said openings, power means for rotating said cylinder and control means for said power means, said control means including a switch secured with said drum, an actuator for said switch mounted on said cylinder to be cooperative with said switch when said openings are in registry, and means associating each cylinder door with said actuator to provide switch-opening positioning of said actuator except when all cylinder doors are closed.

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