March 22, 1927. 1,621,951

F. E. PERKINS

ROLLING FIRE DOOR

Filed March 5, 1923 2 Sheets-Sheet 1

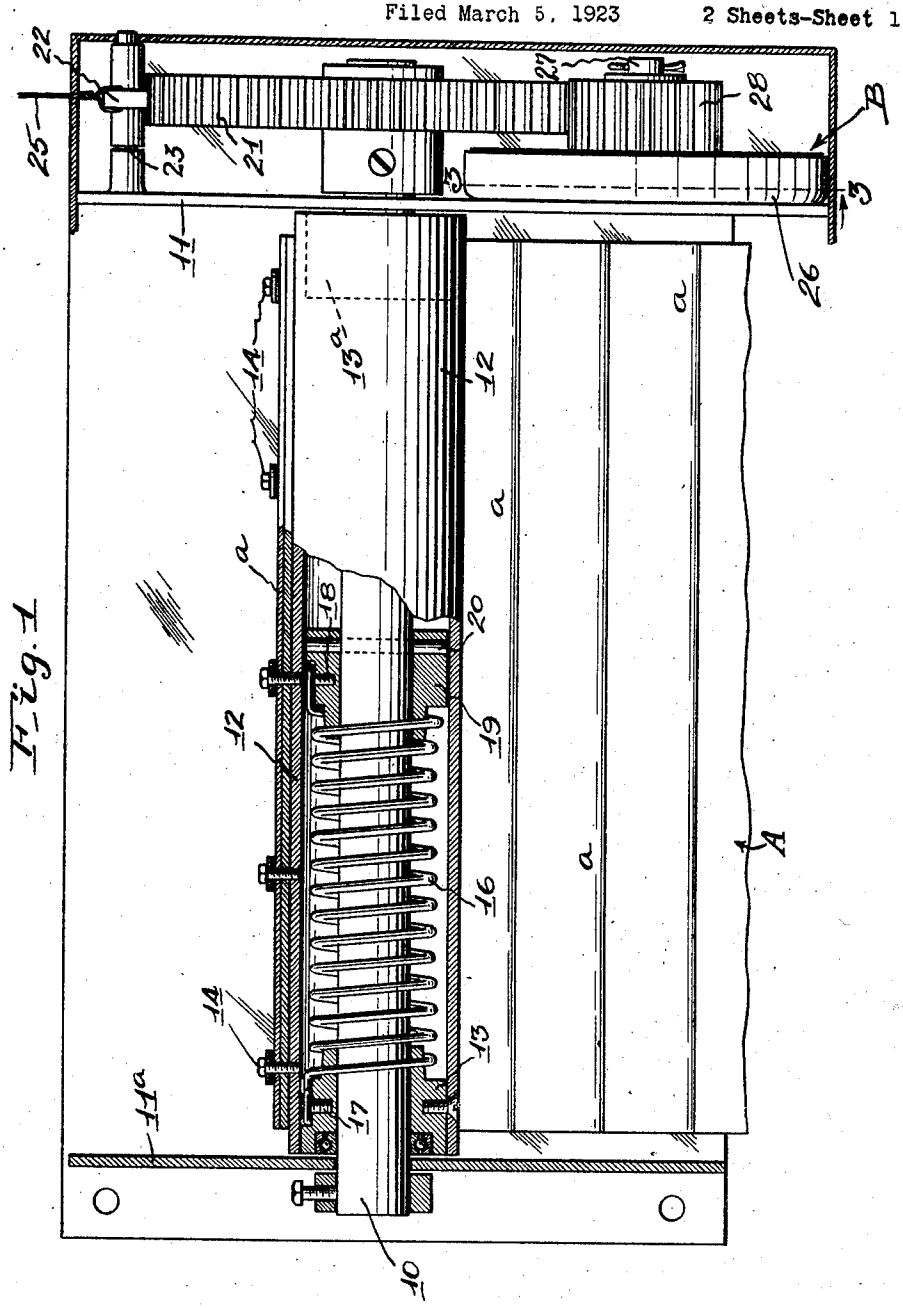


Fig. 1

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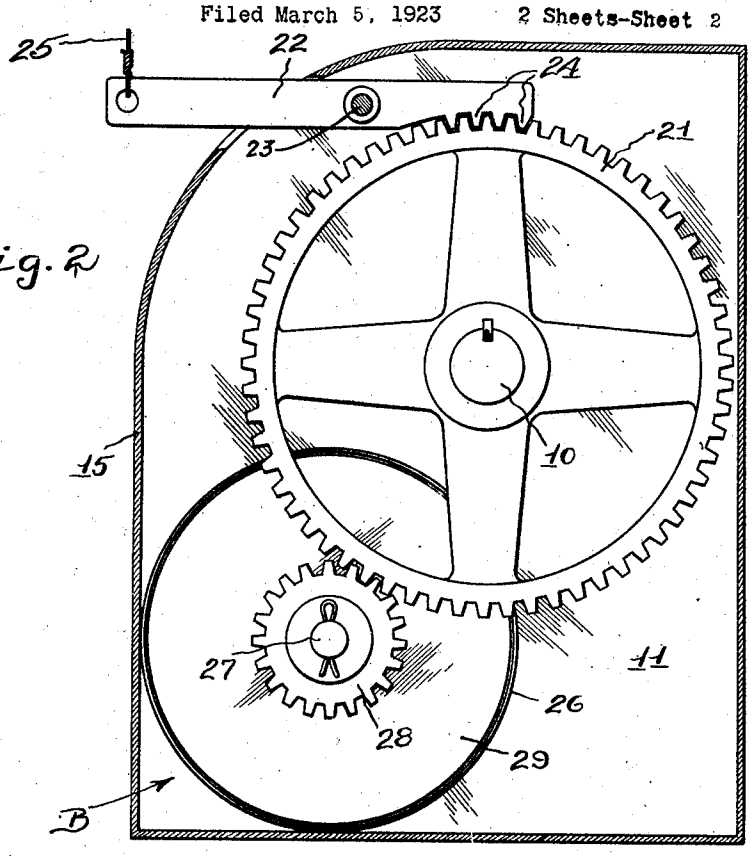


Fig. 2

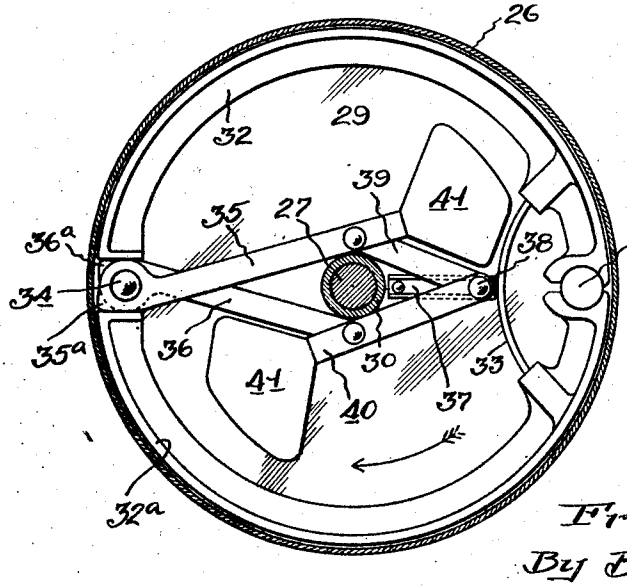


Fig. 3

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Patented Mar. 22, 1927. 1,621,951

UNITED STATES PATENT OFFICE.

FREDERICK E. PERKINS, OF ST. PAUL, MINNESOTA.

ROLLING FIRE DOOR.

Application filed March 5, 1923. Serial No. 622,924.

My invention relates to improvements in rolling fire doors such as are commonly employed in closing doorways in buildings as a precaution against the spreading of fire therein.

Broadly its object is to provide in a door, which may be normally raised and lowered like a window shade and which is fitted with means for automatically providing for the lowering of the door in case of a dangerous rise in temperature, improved brake mechanism for retarding the fall of the curtain and saving it against injurious shock when it reaches the floor.

More specifically it is my object to provide in a device of this nature an effective centrifugal brake associated through simple and convenient connections with one end of the curtain balancing spring, whereby a regulated amount of balancing force is retained within the released spring until after the curtain falls shut.

With the foregoing and other objects in view, which will appear in the following description, the invention resides in the novel combination and arrangement of parts and in the details of construction hereinafter described and claimed.

In the drawings, Fig. 1 is a front elevational view of a door embodying my invention, certain parts being broken away to show interior construction; Fig. 2 is a view partly in elevation and partly in section, the elevational portion illustrating the door structure as seen from the right of Fig. 2 and the sectional portion illustrating a housing for said door structure and Fig. 3 is a sectional view illustrating, in detail, the centrifugal brake, said view being taken on the line 3—3 of Fig. 1.

Referring to the drawings, wherein similar reference characters are employed to designate similar parts throughout the several views, I have used the numeral 10 to indicate a curtain shaft and 11, 11ª to designate brackets for revolubly supporting said shaft. A sleeve-like roller 12 has bushings 13, 13ª in the ends thereof journaled on the shaft 10. A curtain A, made up of a plurality of slats *a* pivoted edge to edge, is adapted to be wound upon and unwound from the roller 12, one end of said curtain being fastened by means of bolts 14 to said roller. The brackets 11, 11ª are located with respect to a doorway so that the curtain will close said doorway when lowered and leave it unobstructed when wound upon the roller 12. A housing 15 (Fig. 2) covers the wound curtain A and braking mechanism soon to be described. A helical spring 16, encircling the shaft 10 within the roller 12, is secured at one end by means of a screw 17 to the bushing 13. The other end of said spring 16 is secured by means of a screw 18 to a collar 19 keyed on the shaft 10 by a pin 20. Enough tension is put in the spring 16 by turning the curtain shaft 10 to balance the curtain A in wound, unwound and partially unwound relations, a large gear 21 being keyed to said shaft 10 to normally lock the same against rotation and thereby retain the balancing force in said spring 16. The locking mechanism includes a lever 22 pivoted near the rear end thereof on a stud 23 reaching sideward from the bracket 11, said end of said lever being toothed as at 24 to mesh with the teeth in said gear 21. The forward end of the lever 22, in the absence of resistance, falls by gravity, thus disengaging the toothed rear end of said lever from the gear 21. Normally, this lever 22 is held in gear locking relation by a conventional fuse link strand 25 arranged in any suitable manner and adapted to be automatically severed upon a dangerous rise in temperature.

From the foregoing, it will be understood that the curtain A may be readily raised and lowered to open and close the door and that, in the event of severance of the fuse link strand 25 by excessive heat, the curtain will fall automatically. This automatic lowering of the curtain is caused by gravity, following the freeing of the shaft 10 by the locking lever 22 and the consequent spending of the balancing force in the spring 16.

A centrifugal brake B, geared to the shaft 10 through the gear 21 thereon, allows the spring 16 to uncoil sufficiently to permit the unwrapping of the curtain by gravity, but controls the uncoiling of said spring during the fall and after the closing of the curtain, whereby damage to said curtain in closing and damage to said spring in uncoiling is avoided. The brake B includes a brake drum 26 fixed to the bracket 11. A stud 27 reaching from said bracket axially of said drum supplies a bearing for a small gear 28 and a disc or head 29 having a hub 30 thereon. Said gear 28 meshes with the large gear

21 on the curtain shaft 10 and is fixed with respect to the drum head 29. A pin 31 on the margin of the head 29 supplies a common pivot for opposed semi-circular brake shoes 32, 32ª which when spread apart at their free ends, are adapted to engage the inner periphery of the brake drum 26. A bowed leaf spring 33 joining the brake shoes 32, 32ª yieldingly holds the same from engagement with the brake drum 26. Reaching from the head 29 between the adjacent free ends of the shoes 32, 32ª is a pin 34. Pivoted at their ends on this pin is a lever 35 and an arm 36, the former having a cam 35ª thereon engaging the free end of the shoe 32ª and the latter having a cam 36ª thereon engaging the adjacent free end of the shoe 32. The free ends of the lever 35 and arm 36 extend to opposite sides of the stud 27. In diametrical position with respect to the pin 34 and on the side of the stud 27 opposite said pin, is a channel-like guide 37 secured to the head 29. A pintle or slide 38 formed with a head (not shown) slidable in said guide, pivotally connects a link 39 and lever 40, the former being pivotally connected with the lever 35 and the latter with the arm 36. The levers 35 and 40 are equipped with weights 41 at the ends thereof.

Following the tripping of the locking lever 22 and the initial uncoiling of the spring 16, the curtain A starts to fall by gravity, and the weights 41 are urged outward by centrifugal force upon rotation of the head 29. Before the lower edge of the curtain A reaches the floor and prior to the entire expenditure of balancing force in the spring 16. the shoes 29 are engaged with the brake drum 26, thus retaining a part of the unspent balancing power in said spring. After the closing of the curtain A, the spring 16 completely spends itself under control of the brake B. Thus it will be seen that the impact of the curtain A against the floor is minimized and that injury to the spring 16 and its connections are avoided by preventing the unrestrained uncoiling of said spring. Owing to the described arrangement of the levers 35 and 40, arm 36, link 39 and guide 37 said levers are caused to occupy similar relative positions within the drum 26 and to operate the shoes 32 in unison.

Changes in the specific form of my invention, as herein disclosed, may be made within the scope of what is claimed without departing from the spirit of my invention.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In a device of the class described, a roller, a curtain adapted to be wound upon and unwound from said roller, a spring arranged and normally tensioned to balance the curtain, means for normally retaining the balancing tension in said spring, said means being adapted to be rendered inoperative upon a dangerous rise in temperature, a centrifugal brake to control the release of said spring, said brake comprising a stationary drum, a revoluble head connected with and turned by said spring, brake shoes pivoted on said head, a cam arm and a cam lever pivoted on a common axis between the adjacent free ends of said shoes, a guide on said member diametrically opposed to the pivotal mounting for said arm and lever, a slide in said guide, a link pivoted to said slide and to said lever at one side of the center of said head, a second lever having a pivotal connection with the arm at the other side of said center and also with said slide, and weights on the ends of said levers.

2. In a device of the class described, a curtain shaft, brackets revolubly supporting the same, a curtain roller revolubly mounted on said shaft, a curtain attached at one end to said roller and adapted to be wound thereon and unwound therefrom, a helical spring encircling said shaft, one end of said spring being fixed with respect to the roller and the other end thereof being fixed with respect to said shaft, said spring being tensioned to normally balance the curtain, a centrifugal brake operatively connected with said shaft and means normally securing the shaft against rotation, said means being adapted to free said shaft upon a dangerous rise in temperature, whereupon the spring is released and the brake operated to control the uncoiling of said spring and the falling of the curtain.

3. In a device of the class described, a roller, a curtain adapted to be wound upon and unwound from said roller, a centrifugal brake including a revoluble member, speed increasing mechanism geared to said member, a helical spring normally tensioned to balance said curtain, one end of the spring being fixed with respect to the roller and the other end thereof connected with said speed increasing mechanism for operating the same, and means for releasing said last mentioned end of said spring upon a dangerous rise in temperature, said brake being adapted to control the unwinding of said spring, whereby the fall of the curtain is retarded.

4. In a device of the class described, a roller, a curtain adapted to be wound upon and unwound from said roller, a centrifugal brake including a revoluble member, a curtain balancing spring fixed at one end with respect to the roller and operatively connected at its other end with said revoluble member for turning the same, and means normally securing the revoluble brake member against rotation and adapted to free said member upon a dangerous rise in tempera-

ture, the rotation of said member effecting a braking action for controlling the releasing action of said spring.

5. In a device of the class described, a roller, a curtain adapted to be wound upon and unwound from said roller, a spring arranged and normally tensioned to balance said curtain, means for normally retaining the balancing tension in said spring, said means being adapted to be rendered inoperative upon a dangerous rise in temperature, and a brake to control the releasing action of said spring.

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

FREDERICK E. PERKINS.