W. B. GERVAIS.

AUTOMATIC FIRE DOOR.

APPLICATION FILED FEB. 21, 1917.

1,290,169.

Patented Jan. 7, 1919.

2 SHEETS—SHEET 1.

Fig. 1

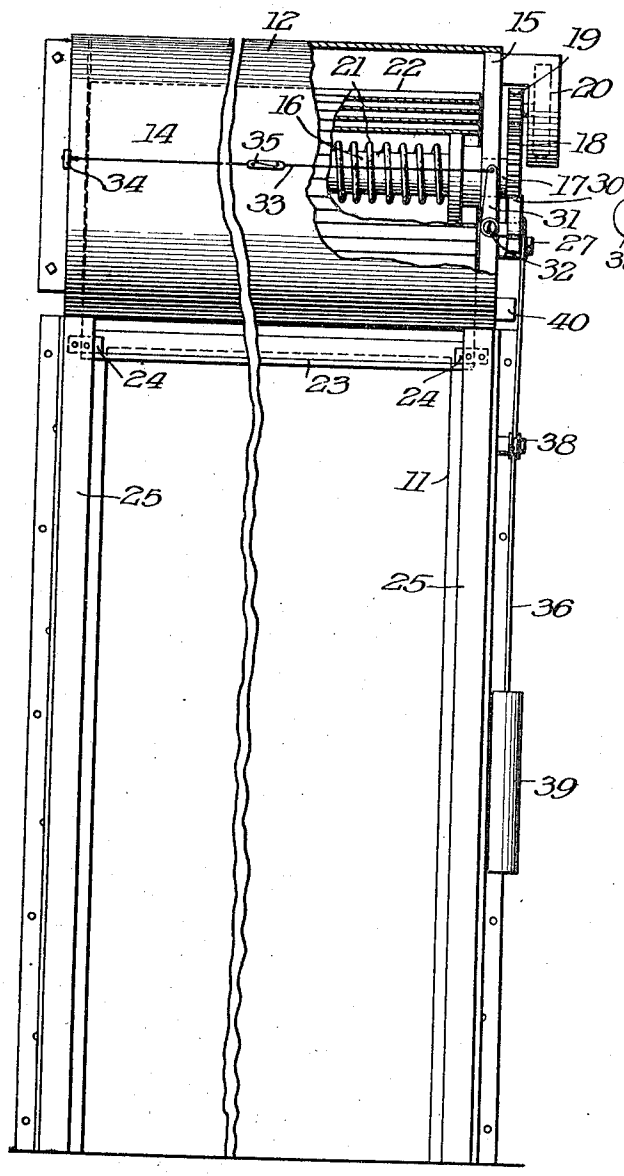
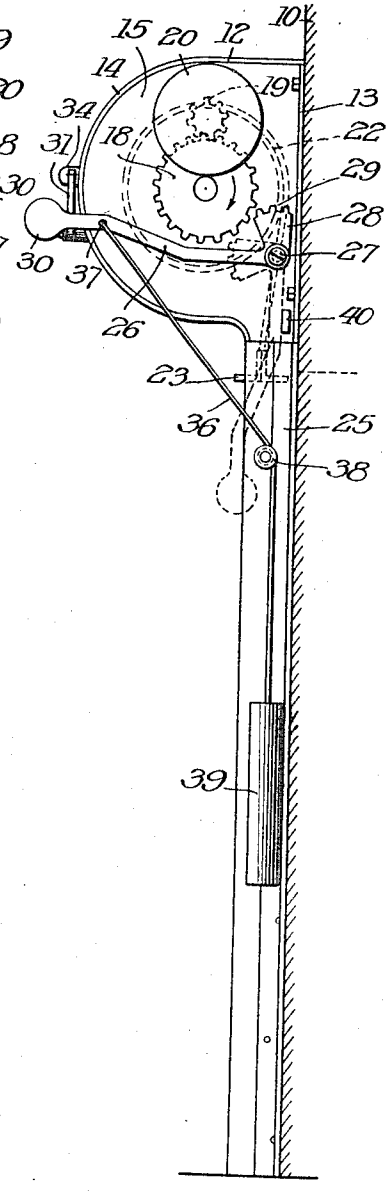


Fig. 2



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2 SHEETS—SHEET 2.

Fig. 3

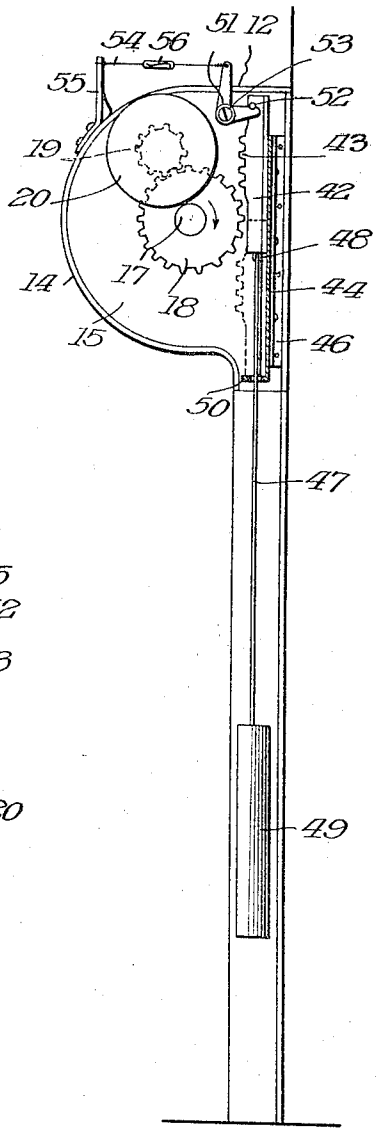
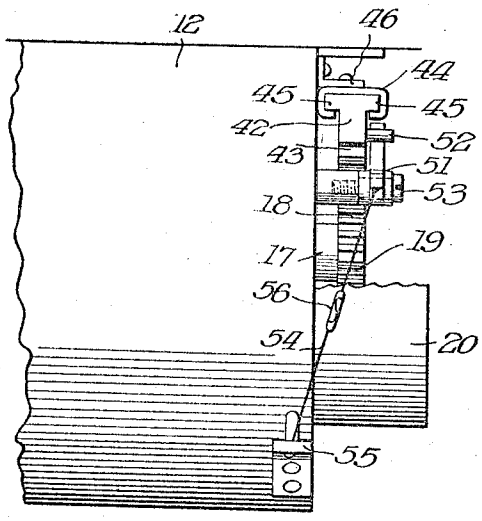


Fig. 4



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WAINWRIGHT B. GERVAIS, OF CHICAGO, ILLINOIS, ASSIGNOR TO VARIETY MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

AUTOMATIC FIRE-DOOR.

1,290,169. Specification of Letters Patent. Patented Jan. 7, 1919.

Application filed February 21, 1917. Serial No. 150,258.

To all whom it may concern:

Be it known that I, WAINWRIGHT B. GERVAIS, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Automatic Fire-Doors, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

The present invention relates broadly to automatic fire doors and has particular reference to new and useful improvements in automatic means for starting a gravity operated fire door into the closed position.

In the spring-balanced flexible fire doors, as now employed, some means must be provided for causing the initial starting of the door in its descent to closed position. Various methods of reaching the desired result are employed, such as dropping a weight upon the ends of the bottom angle iron of the door, starting the door by springs, and various other methods. The principal disadvantage of the spring method is the difficulty encountered in perfectly balancing two different strengths of spring, as well as the cost of installation. The disadvantage of dropping a weight on the ends of the bottom angle iron of the door resides in the fact that when the door is half or more than half way closed dropping of a weight on the angle iron very often results in damaging the same and thus rendering useless the door for future emergencies unless repaired.

With the foregoing objections in view I have conceived an automatic weight of a novel and improved form for imparting an initial movement to a door to start the same in an emergency, the principal advantage of the same being that no matter what position the door occupies at the time the emergency arises the weight will act upon the same safely and surely and without danger of any breakage.

Another object of my invention is to provide mechanism of the class referred to which may be applied to any door of the type referred to without material structural alteration of the same.

Other objects of my invention not hereinbefore set forth will appear from the following detailed description and the claims taken with an inspection of the accompanying drawings, in which—

Figure 1 is a top elevational view of a door embodying the improvements of my invention, parts thereof being broken away;

Fig. 2 is an end elevational view of the same;

Fig. 3 is an end elevational view of a modified form of the invention; and

Fig. 4 is a fragmental top plan of the same.

Referring more particularly to the drawings, and specifically to Figs. 1 and 2, wherein similar characters of reference designate like and corresponding parts, 10 designates the wall of a building having an opening 11 therein.

Above the top of the opening I mount the usual casing 12 having a vertical rear wall 13 mounted in any suitable manner on the wall 10. The front of the casing is cylindrical as indicated at 14, and the end wall 15 thereof supports the free ends of a drum 16, one of the free ends being best shown in Fig. 1 and designated 17. A gear 18 is mounted on the free end 17 of the drum 16 which gear meshes with a pinion 19 operatively connected with a centrifugal governor 20 to regulate the speed of the door when moving into closed position. The drum is balanced by means of a coiled spring 21 surrounding the same and the door, which is of a flexible type, is wound about said drum and designated 22. The free end of the door carries an angle iron 23 and lugs 24 are mounted on the free ends of the angle irons. The lugs 24 engage in suitable guideways 25 mounted adjacent the door opening 11. The structure set forth in the foregoing is a standard structure now in general use and forms no essential part of my invention.

The device of the preferred form of my invention preferably embodies an arm 26 pivoted on a trunnion 28 mounted on one of the end walls 15 of the casing 12. A lug 28 is formed integrally with the arm and preferably at right angles thereto, the free end of the lug having a plurality of fragmental gear teeth 29 adapted, at a predetermined time, to engage the gear 18 and impart movement thereto. The free end of the

arm 26 is enlarged to form a weight, normally tending to move the arm into the dotted line position shown in Fig. 2.

Normally the arm 26 is in the horizontal position shown in full lines in Fig. 2, this position being maintained by virtue of one arm of the bell-crank lever 31, said lever being pivoted at 32 on the top of the casing 12. The other arm of the bell-crank lever is connected to a wire, cable or the like 33, the opposite end of the cable being anchored at 34 to the casing or any other stationary object. A fusible link 35 is interposed in the cable which link is adapted to melt when the same is subjected to an abnormally high temperature whereby to automatically release the bell-crank lever. In order to render more positive the operation of the arm 26 I provide a cable 36 connected at 37 to the arm 26 adjacent its free end. The cable is trained over a pulley 38 mounted on one of the guideways 25 and carries on its free end a supplemental weight 39. A stop 40 carried by the casing, or mounted in any other convenient manner, serves to arrest movement of the arm 26.

Referring to the modified form of my invention illustrated in Figs. 3 and 4, it will be seen that the casing 12 is employed as in the preferred form of the invention. The gear 18 is also provided and the centrifugal governor 20. However, in this form of the invention, I provide a rack-bar 42 having a plurality of teeth 43 on the outer face thereof. The rack-bar is mounted in a guide 44 which guide is shaped to engage flanges 45 formed on the rack-bar. Thus the rack-bar is mounted for vertical movement in the guide and is restrained against accidental displacement outwardly by virtue of the shape of the guide. An angle iron 46 supports said guide. A cable 47 is connected at 48 to the lower end of the rack-bar 42, said cable having a weight 49 on its free end. The cable passes through an aperture formed in a lateral extension 50 formed on the guide 44, which extension not only guides the cable but forms a stop for the rack-bar after its mission is performed. The rack-bar is maintained in the upper position as best shown in Fig. 3 by means of one arm of a bell-crank lever 51, which latter engages under a pin 52 carried by the upper end of the rack-bar. The bell-crank lever is pivoted at 53 on the casing 12 and the free arm thereof is connected to the free end of the cable 54. The cable 54 is anchored to the bracket 55 and a fusible link 56 is interposed in said cable.

Again referring to the preferred form of the invention the operation is as follows:

With the parts set as shown in Figs. 1 and 2 and the door in the raised position in the event of an emergency brought about by fire the link 35 will become fused breaking the cable and releasing the bell-crank lever 31. The weight 39 combined with the weight of the arm 26 will move said bell-crank lever 31, releasing the arm 26 and permitting the same to fall by gravity into the dotted line position, shown in Fig. 2. As this movement occurs the teeth 39 on the lug 28 engage the gear 18 imparting a slight turning movement thereto which is just sufficient to start the door on its downward trip. Immediately the arm reaches the dotted line position the lug is disengaged from the gear and the door is free to descend of its own weight into the closed position. Of course, other connections of the fusible cable may be used.

Referring to Figs. 3 and 4 the operation of this form of my improved mechanism is as follows:

When the cable 54 is severed by fusing the link 56, the bell-crank lever 51 is released and the weight 49 acting upon the rack-bar 42 causes descent of the same, and while the rack-bar is in course of downward movement the teeth 43 thereof engage in the teeth of the gear 18 imparting a movement thereto similar to the movement imparted to the gear in the preferred form of the invention. The movement imparted to the gear is sufficient to start the door on its downward journey to closed position. The centrifugal governor 20 serves to prevent damage to the door opening to a too rapid descent.

Thus it will be seen that no matter what position the door may occupy at the time the emergency arises the same may be started into the closed position automatically. This feature is attainable by virtue of the provision of means to engage the door only for a fraction of the descent just sufficient to start the door. It is apparent that by slight structural alteration of the exterior of the casing either of the forms of my invention may be applied to any of the standard flexible rolling doors in use, and such application of the device is attended by a minimum expenditure of time and labor.

While I have shown and described my invention as embodying specific features of construction I desire it to be understood that such changes may be made therein as do not depart from the spirit and scope of the invention as claimed.

I claim:

1. In combination, a spring roller, a flexible curtain to be wound thereupon, a centrifugal governor connected to the roller, a gear connected to the roller, a weight, and means connected to the weight normally disconnected from the gear and adapted to engage the latter when released.

2. In combination, a casing having a balanced drum therein, a flexible shutter wound upon the drum, a gear connected to the drum, a weighted arm pivoted on the casing

and having a toothed portion to engage the gear, means to restrain the arm against movement, and fusible means for holding said restraining means.

3. In combination, a casing having a spring balanced drum therein, a flexible shutter wound upon the drum, a gear connected to the drum, a centrifugal governor connected with said gear, a weighted arm pivoted on the casing and having a toothed portion to temporarily engage said gear and impart movement thereto, a bell-crank lever having one arm disposed beneath said pivoted arm, a fusible member to restrain said bell-crank lever, and a supplemental weight connected with said arm.

4. In combination, a casing having a balanced drum therein, a flexible shutter wound upon the drum, a gear connected to the drum, a vertically movable gravity operated member on the casing having teeth to engage the gear, a weight to actuate the gravity operated member, and fusible restraining means for said member.

5. In combination, a balanced drum, a flexible shutter wound thereon, a gear connected to the drum, a weight, fusible means to restrain the weight, and a toothed member movable by the weight and adapted to mesh with the gear and impart motion to the drum when the weight is released, said member being normally out of mesh with the gear.

In witness whereof I hereunto subscribe my name this 9th day of February, A. D. 1917.

WAINWRIGHT B. GERVAIS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."