

T. E. COLLINS.
FIRE DOOR.
APPLICATION FILED MAR. 10, 1909.

984,799.

Patented Feb. 21, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

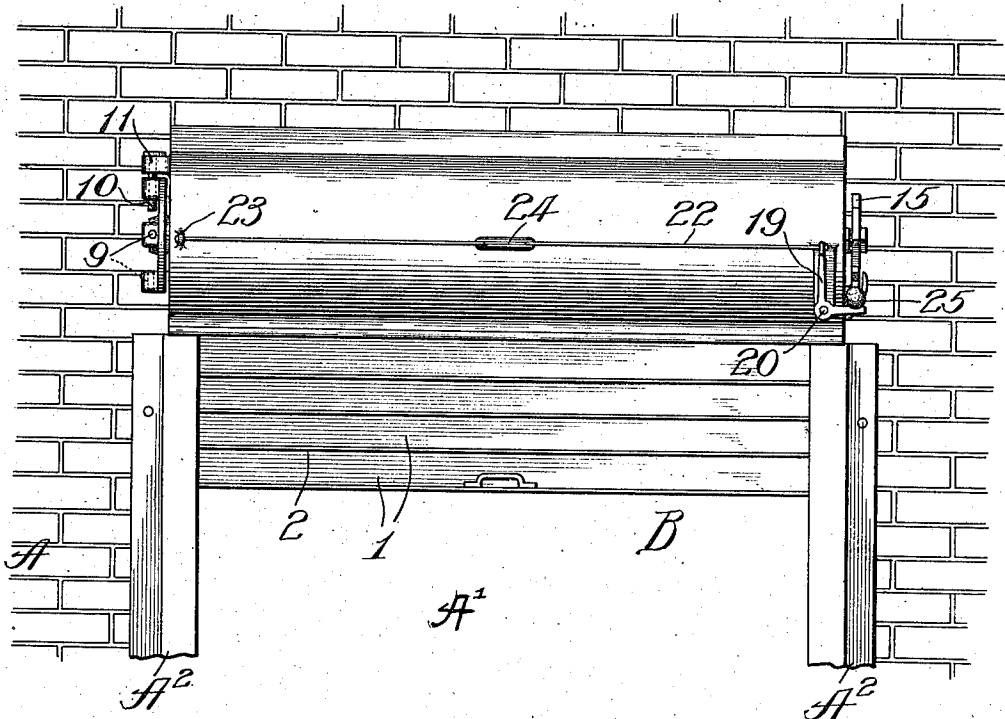


Fig. 2.

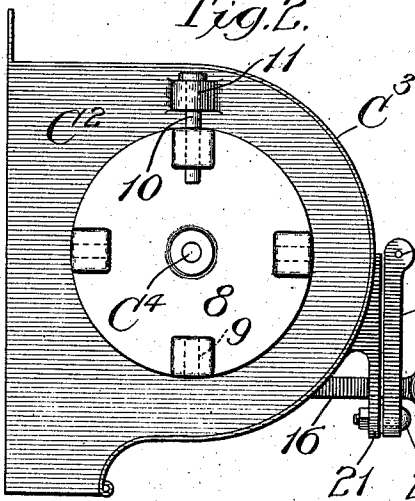
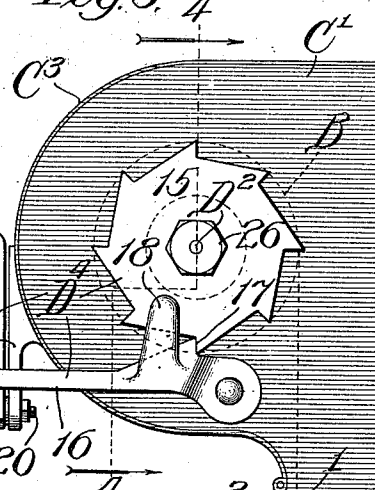


Fig. 3. 4



Witnesses:

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2 SHEETS—SHEET 2.

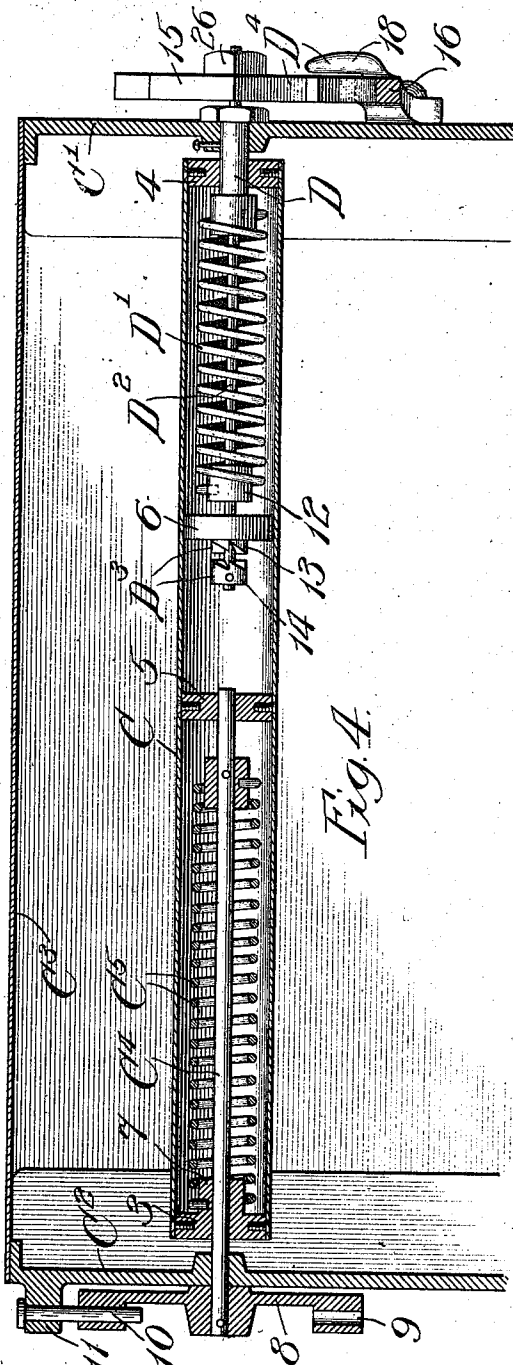


Fig. 4.

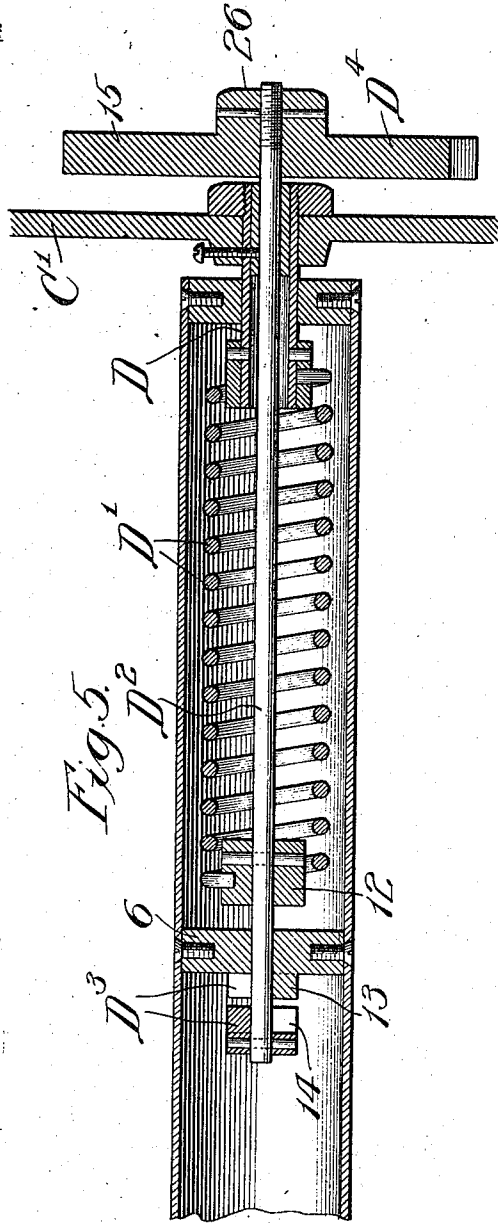


Fig. 5.

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UNITED STATES PATENT OFFICE.

THOMAS E. COLLINS, OF CHICAGO, ILLINOIS.

FIRE-DOOR.

984,799.

Specification of Letters Patent.

Patented Feb. 21, 1911.

Application filed March 10, 1909. Serial No. 482,588.

To all whom it may concern:

Be it known that I, THOMAS E. COLLINS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Fire-Doors, of which the following is a specification.

My invention relates particularly to rolling shutters employed as fire-shutters; and my primary object is to provide an improved construction whereby the shutter will be operated in an improved manner to effect an automatic closure in the event of fire.

The invention is illustrated in its preferred embodiment in the accompanying drawings, in which—

Figure 1 represents a portion of a fire-wall having a door, or window, constructed in accordance with my invention; Fig. 2, an end-view of the casing or hood in which the drum and shutter are normally housed, this view showing also a portion of the means for permanently securing a counterbalancing spring connected with the roller or drum upon which the roller or flexible shutter is mounted; Fig. 3, an opposite end-view of said casing or hood, showing also automatically-controlled mechanism controlling a shutter-closing spring which is adapted to be operatively connected with the roller to lower the shutter in the event of fire; Fig. 4, a broken vertical section taken, as indicated, at line 4 of Fig. 3; and Fig. 5, a broken section on an enlarged scale showing more in detail the mechanism appearing in the right-hand portion of Fig. 4.

In the construction illustrated, A represents a fire-wall having a door-opening, or window-opening A¹, equipped with the usual Z-bar guides A²; B, a flexible shutter adapted to work in said guides; C, a roller or drum with which the upper end of the shutter is connected in any desired manner (not shown); C¹, C², a pair of brackets supported by the wall above the door-opening and upon which is mounted a hood C³, in which the drum and shutter are normally housed; C⁴, a shaft projecting through the bracket C² and adjustably fixed thereto, said shaft extending into the drum C and equipped with a counterbalancing spring C⁵ which serves to normally hold the shutter in an elevated position; D, a tubular shaft or sleeve carried by the bracket C¹ and extending into the adjacent end of the drum C; D¹, a shutter-closing spring having one end

secured to the inner end of the sleeve D and the other end secured to a longitudinally-shiftable, rotatable shaft D²; D³, means adapted to clutch the shaft D² to the roller or drum C; and D⁴, a device connected with the outer end of the shaft D² and normally restraining the end of the shaft D² from action, said device D⁴ being dependent for release upon a change in temperature, whereby, in case of fire, the spring D¹ may be thrown into operative engagement with the roller and thus serve to rotate the roller in a direction to lower the shutter.

The guides A² for the shutter may be of any suitable construction. As has been indicated, Z-bars are commonly employed for forming such guides. The shutter B comprises, as usually constructed, metal slats 1 which are connected by hinges 2, as illustrated in Figs. 1 and 3.

The drum C may comprise a cylinder provided with end-blocks 3 and 4 secured to the cylinder and having central perforations for the shafts C⁴ and D. The drum is provided with bearings 5 and 6 adapted to receive the inner ends of the shafts C⁴ and D². One end of the spring C⁵ is connected with the shaft C⁴ near its inner end, and the other end of said spring is connected with a boss or hub 7 with which the end-member 3 of the drum is equipped. The outer end of the shaft C⁴ is equipped with a wheel 8 provided with lugs having radial perforations 9. The wheel 8 is adapted to be turned to place the requisite tension upon the spring C⁵, after which the wheel may be secured by a pin or bolt 10 which passes through a lug 11 carried by the bracket C² and enters one of the perforations 9 of the wheel. Thus, the counterbalancing spring C⁵ is permanently connected with a stationary part and said spring C⁵ is normally under tension in a direction to counterbalance the shutter.

As has been indicated, the tubular shaft D is fixedly secured to the bracket C¹, and one end of the spring D¹ is fixedly secured to the inner end of said tubular shaft. The other end of the spring D¹ is connected with a collar 12 which is rigidly secured to the shaft D², said spring D¹ being normally under tension longitudinally, when the mechanism D⁴ is set, so that when the shaft D² is released it will be moved longitudinally to throw the clutch-members of the clutch-device D³ into operative engagement. The clutch-device D³ comprises a clutch-member

13 which may be formed integrally with the member 6, and a clutch-member 14 carried by the inner end of the shaft D², the inner end of said shaft projecting through the member 6, as clearly shown in Fig. 5.

The automatic controlling-device D⁴ comprises a ratchet-wheel 15 fixedly secured to the outer end of the shaft D² which projects through the sleeve or tubular shaft D and extends outside of the bracket C¹; a locking-pawl 16 having a tooth 17 adapted to engage a tooth of the ratchet-wheel and having a finger 18 adapted to engage the outer surface of the ratchet-wheel and normally prevent the shaft D² from shifting longitudinally; a bell-crank lever 19 supported on a pivot 20 carried by a bracket 21; and a wire 22 connected with the lever 19 and with a stationary lug 23, said wire 22 being provided in its course with a fusible link 24 adapted to melt at a predetermined temperature, thereby to release the lever 19 and permit the locking-pawl 16 to drop away from the ratchet-wheel 15. The arm of the locking-pawl 16 is equipped with a weight 25 adapted to insure the quick release of the locking-pawl. The outer end of the shaft D² is equipped with a fixedly secured hexagon nut 26 (shown integral with the ratchet-wheel) to which a wrench may be applied to enable the shaft D² to be turned to apply tension to the spring D¹. This operation may be performed while the finger 18 of the locking-pawl 16 is in position to prevent the shaft D² from shifting longitudinally, the pawl being elevated to its final position to lock the ratchet-wheel against rotation after the spring has been properly tensioned.

The operation will be readily understood from the foregoing description. The flexible shutter is normally wound upon the barrel C, and maintained in the elevated position by the counterbalancing spring C⁵. The device D⁴ is preparatorily set, so as to maintain the spring D¹ under tension in a direction adapted to rotate the barrel C in a direction opposed to the action of the counterbalancing spring C⁵. Said spring D¹ is normally distended somewhat longitudinally, so that it has a tendency to shift the shaft D² outwardly and throw the clutch-member 14 into engagement with the clutch-member 13 carried by the drum. In the event of a fire, the link 24 will be fused at a comparatively low temperature, whereupon the lever 19 will be released and permit the locking-pawl 16 to fall, thereby releasing the ratchet-wheel 15 from engagement with the locking-tooth 17 and also from engagement with the bearing-finger 18. The spring D¹ will thereupon operate to shift the shaft D² outwardly, to cause it to become clutched to the drum, and the spring will then operate to forcibly rotate the drum

in a direction to lower the shutter. Inasmuch as the spring D¹ is under greatest tension at the instant it begins to operate to rotate the drum so as to cause the shutter to descend, the shutter will descend most rapidly at the beginning and will have a tendency to slow up as it approaches the lower end of its guide, this action being aided by the increasing tension upon the spring C⁵, so that undue shock will not result when the shutter reaches the lower end of its traverse.

The foregoing detailed description has been given for clearness of understanding only, and no undue limitation should be understood therefrom.

What I regard as new, and desire to secure by Letters Patent, is—

1. In means of the character set forth, the combination of a drum, a shutter connected therewith, a longitudinally-shiftable shaft extending into said drum and equipped with a clutch-member, a spring connected with said shaft and with a stationary part, and restraining means connected with said shaft and equipped with a fusible member.

2. In means of the character set forth, the combination of a drum, a shutter connected therewith, a stationary sleeve extending into one end of said drum, a shaft extending through said sleeve, a spring connected with said sleeve and with said shaft, means for clutching said shaft to said drum, and restraining means connected with the outer end of said shaft and equipped with a fusible member.

3. In means of the character set forth, the combination of a drum, a shutter connected therewith, a stationary sleeve extending into said drum, a shaft extending through said sleeve, a coiled spring connected with said sleeve and with said shaft, clutch-members carried by said drum and by said shaft, said shaft being longitudinally shiftable, a ratchet-wheel connected with the outer end of said shaft, and a pawl having a tooth engaging a tooth of said ratchet-wheel and having a bearing engaging the outer surface of the ratchet-wheel and serving to prevent longitudinal shifting of said shaft.

4. In means of the character set forth, the combination of a drum, a shutter connected therewith, a longitudinally-shiftable shaft extending into said drum, a spring in said drum connected with said shaft, a stationary part connected with said spring, said spring being normally under torsional stress and also under longitudinal stress, means for clutching said shaft to said drum, when said shaft is shifted longitudinally, and automatic controlling means connected with the outer end of said shaft and serving to prevent longitudinal shifting and rotation of said shaft.

5. In means of the character set forth, the

combination with a drum of a fixed shaft extending into one end thereof, a counterbalance spring connected with said shaft and with said drum, and normally under tension in a direction to hold said shutter elevated, a shaft extending into the other end of said drum, a spring connected with said second-named shaft and normally under tension in a direction adapted to turn said drum in a direction opposed to the action of said counterbalance spring, means for clutching said second-named shaft to said drum, and means normally restraining said second-named shaft from action and dependent for release on a dangerous rise in temperature.

6. In means of the character set forth, the combination of a drum, a shutter connected

therewith, a fixed sleeve upon which one end of said drum is journaled, a shutter-closing spring in said drum having one end connected with said sleeve, a shaft extending through said sleeve and connected with the other end of said spring, clutch-members carried by said shaft and said drum, a ratchet-wheel connected with the outer end of said shaft, a locking-pawl connected with said ratchet-wheel, and holding means for said locking-pawl provided with a fusible member.

THOMAS E. COLLINS.

In the presence of—

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J. G. ANDERSON.