L. G. WILSON.

FIRE RESISTING SHUTTER.

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917,983.

Patented Apr. 13, 1909.

FIG. 2.

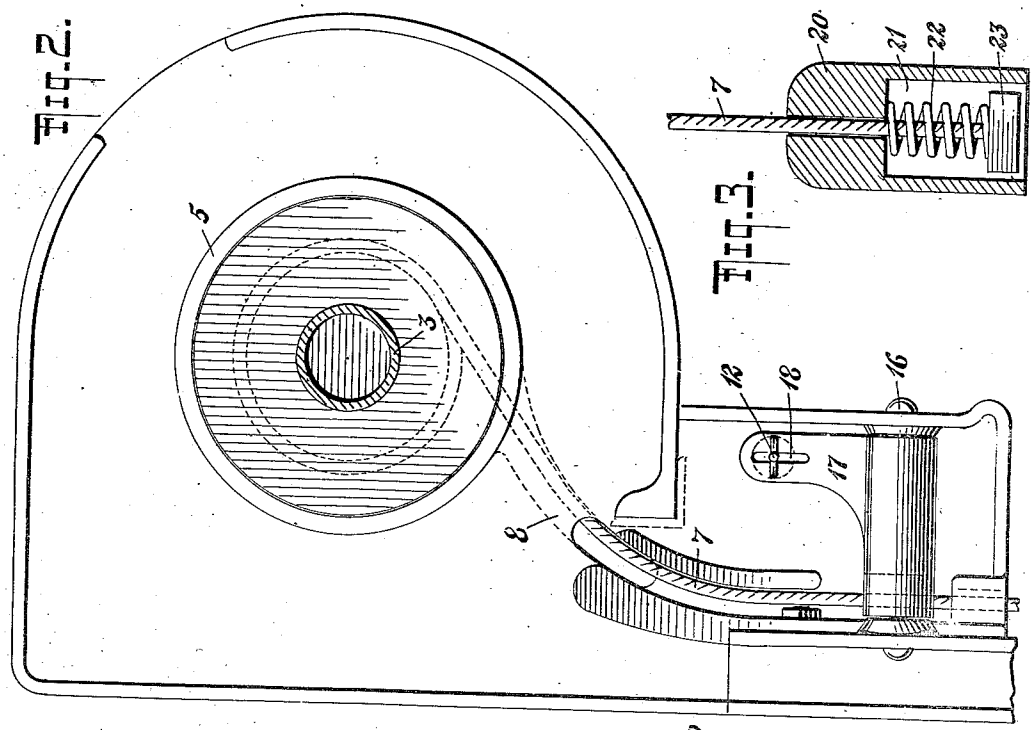
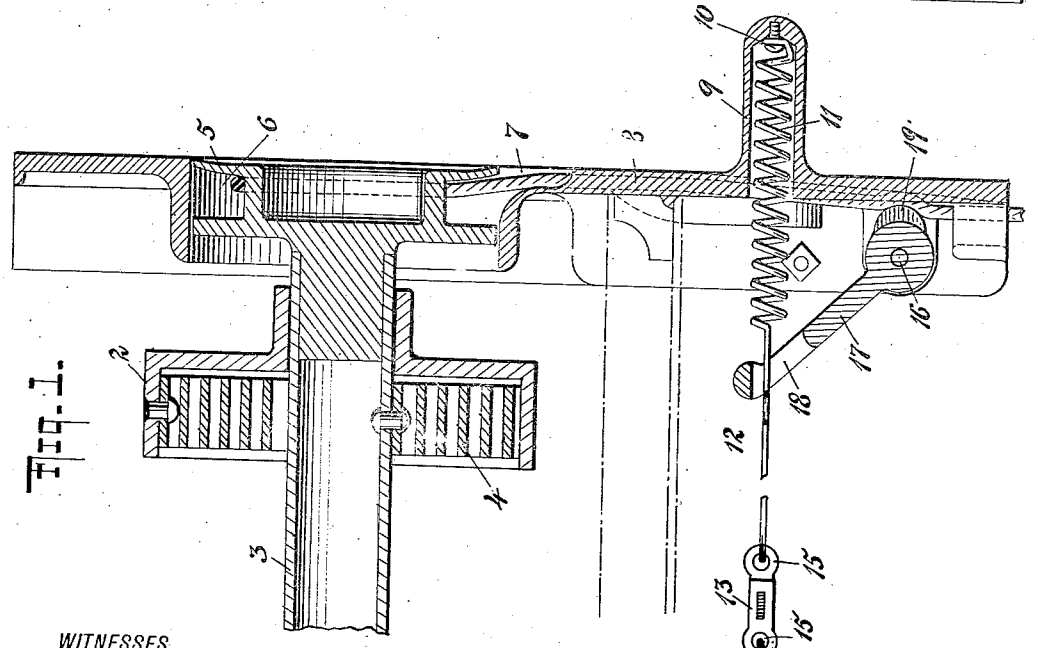


FIG. 3.

FIG. 1.



WITNESSES

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FIRE-RESISTING SHUTTER.

No. 917,983. Specification of Letters Patent. Patented April 13, 1909.

Application filed November 12, 1908. Serial No. 462,213.

To all whom it may concern:

Be it known that I, LESTER G. WILSON, a resident of Larchmont, Westchester county, State of New York, have invented certain new and useful Improvements in Fire-Resisting Shutters, of which the following is a full, clear, and exact specification.

My invention relates to rolling shutters made of fire resisting material and adapted to automatically close over the opening that is to be protected whenever the temperature in the immediate vicinity of the shutter shall reach a definite and predetermined maximum.

My invention has reference to automatic shutters of the counterbalanced type, in which the shutter may be normally opened or closed to any desired extent without interference with the automatic releasing device; and comprises certain special constructions and arrangements of parts as will more fully appear as the specification proceeds.

The object of my invention is to provide a means by which, in case of fire, the shutter may be released automatically, positively, and certainly, without risk of failure and without entailing damage to structural or functional parts of the curtain.

A further object is to enable the shutter to be quickly and easily reset in operative position without the aid of special tools or labor.

A further object of my invention is to enable the shutter to be set in operative position at practically any opening less than its full extent.

Still further objects of my invention will hereafter appear.

Referring to the drawings which show a preferred embodiment of my improved shutter; Figure 1 is a sectional elevation showing one casing head together with the end of the shutter roller coöperating therewith, as also the essential features of my automatic release; Fig. 2 is an elevation looking from the left of Fig. 1; and Fig. 3 is a sectional elevation of my improved retarding device or "limit-stop."

The shutter proper may be of any usual construction of fire retarding material, as for example, corrugated metal or interlocked slats and is supposed to attach to and roll upon a series of barrels 2, mounted upon a shaft 3, upon which they have free angular movement. Flat, coiled springs, 4, of suitable length are inclosed by each barrel and have their ends attached respectively to the inner periphery of the barrel and to the shaft; when the shutter is fully raised, these springs are given, by independent rotation of the shaft, 3, in a suitable direction, a further uplifting tendency of any desired degree. They serve, therefore, as counterbalancing springs against which the shutter is always lowered; and if the springs, 4, be suitably selected as to length and stiffness and the runways in which the curtain edges travel be properly fitted to such edges, the curtain will remain in any particular place in which it is put. One end of shaft, 3, (not shown in the drawings) is journaled in the ordinary way. The other end is tipped with a fixedly attached groove pulley, 5, in the groove 6, of which a wire rope, 7, is adapted to wind so as to raise or lower the shutter. This wire rope passes from the pulley downwardly in a groove 8, formed in the casing head.

Just below the shutter roll and inside the plane of the shutter, is formed in the casing head an elongated recess, 9, to the bottom of which at 10, is fixed one end of a spiral spring, 11, the other end being prolongated by a straight piece, 12, attached about midway of the shutter to a fusible link, 13; from the other end of this fusible link a second wire, 14, is carried to the other side of the curtain and attached in some convenient manner. The fusible link may be the ordinary article of commerce consisting essentially of two thin, flat pieces of metal with their flats held together by solder of suitable melting point and with eyes, 15, for fastening the wires.

Pivoted to the casing head at 16, a little below spring, 11, is a lever, 17, having a slot 18, through which slot the wire, 12, passes, and into which it is fastened so that as the spring, 11, is contracted or extended, the lever 17 moves upon its pivot. The pivot end of this lever has formed upon it at one side a projecting portion or knob, 19; this knob is so placed on the lever and with relation to the wire rope, 7, that when spring, 11, is extended as in Fig. 1, the knob, 19, is jammed against the wire rope with a wedging action so as to hold said rope in its

groove, 8, and thus maintain the shutter in position.

As shown in the drawings, the shutter is supposed raised and in operative position. If properly set, the tension in springs 4 should be such as to assist in lifting the shutter no matter where it may be in its opening. The curtain will, therefore, remain at any point of its opening where it may be set.

If, for any reason, the temperature in the vicinity of the fusible link 13 should rise to the predetermined limit, the solder in this fuse will melt and the links separate, thus permitting spring, 11, to contract and swing lever, 17, clockwise so as to release the wire rope, 7. Shaft 3 will at once fly around under the tension of springs, 4, and the shutter having now lost the uplift of said springs, and having nothing but the friction of its edges in the grooves to sustain it, will instantly fall its full course from whatever position it may have had.

Since the weight of the shutter becomes increasingly effective as it unrolls, it is clear that the shutter will fall, when released as above, with rapidly accelerated velocity and that some means for checking excessive speed and preventing the shutter from reaching its limit suddenly is required, if permanent damage to the shutter and its mounting is to be avoided. I, therefore, arrest the rotation of shaft 3, after release and before the shutter has fully fallen, at such a point that the "winding up" of springs 4 which will then take place will exert just the amount of retarding force necessary to bring the shutter gently to rest at the limit of its movement. I accomplish this very simply by ending the wire rope 7, at a suitable length and then fixing to such end a suitable stop 20 which when drawn up against the casing head stops the shaft but permits the shutter to continue its fall against the tension of springs 4. In practice I prefer to make the stop, 20, as a cylindrical sleeve slipping over the rope 7, and having a recess 21, in which lies a special spring 22; this spring surrounds the rope and is retained between the bottom of the recess and end of the rope by a washer, 23. When piece 20 reaches the casing head, therefore, shaft 3 is itself not stopped suddenly but gradually, as spring 22 is compressed.

In the absence of excessive temperature, *i. e.*, under normal conditions, the springs 4, are, of course, always set, and the shutter is supposed to be raised and lowered in any ordinary method, as for example, by merely taking hold of it and lifting or pushing as the case may be; the wire rope being used only for the purpose of setting the shutter for automatic release as below described. Under these circumstances, the shutter operates as an ordinary counterbalanced shutter and may be raised or lowered or placed in any desired position.

After an emergency release, as just described, the shutter, if small and light, may usually be readily reset by one person who simply lifts it to its full or any other preferred limit, and at the same time pulls upon the wire rope 7, until the limit-stop 20 is in its proper position. Wire 12 may then be pulled out so as to extend spring 11 and the fusible link and wire be placed. When the shutter is large and heavy, two people are generally required to set it, one raising the shutter while the other simultaneously draws upon the wire rope, holding the latter in its final position until the lever 17 is locked against it and retained by the link and wires 12 and 14.

I may obviously make many alterations of mechanical detail in carrying out my invention without departing from its spirit or going outside its scope.

I am aware that counterbalanced fire resisting shutters have been hitherto made to fall automatically through the intermediation of means fusible by excess of temperature and I do not broadly claim this idea, but only the embodiment and means which have been disclosed and which I particularly set forth in the following claims.

Wherever I use the word "cord" in the claims, I mean any linear, reasonably non-elastic means of generally cordlike character whether round, flat, or otherwise in section and whether of metal or not.

I claim—

1. In a roller for a fire resistant shutter comprising a barrel elastically united to a shaft; a cord coöperating with said shaft and adapted to rotate the same, a device for holding said cord at any desired opening of the shutter, and means fusible at a predetermined temperature operating upon said holding device to release the cord and thereby free the shaft, substantially as described.

2. In a roller for a fire resistant shutter comprising a barrel elastically united to a shaft; a grooved pulley fixed to said shaft, a cord windable in said groove to rotate said shaft, a clamp adapted to hold said cord at any desired opening of the shutter, and means fusible at a predetermined temperature to release said clamp and thereby free the shaft, substantially as described.

3. In a fire resistant shutter adapted to be coiled by a cord coöperating with the shutter shaft, and arranged to close suddenly, damping means attached to said cord and adapted to be engaged as the shutter approaches the limit of its closure, thereby stopping the shutter shaft.

4. In a fire resistant shutter adapted to be coiled by a cord coöperating with the shutter

shaft, and arranged to close suddenly, a "limit-stop" comprising a spring attached to the cord and adapted to be compressed as the shutter approaches the limit of its closure, substantially as and for the purpose described.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

LESTER G. WILSON.

Witnesses:
ELMER SHIRLYOUNG,
ERNST DOSCHER.