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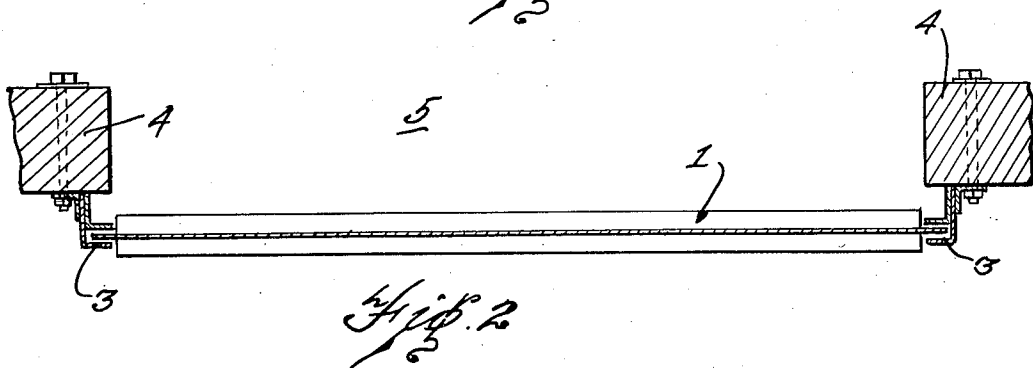
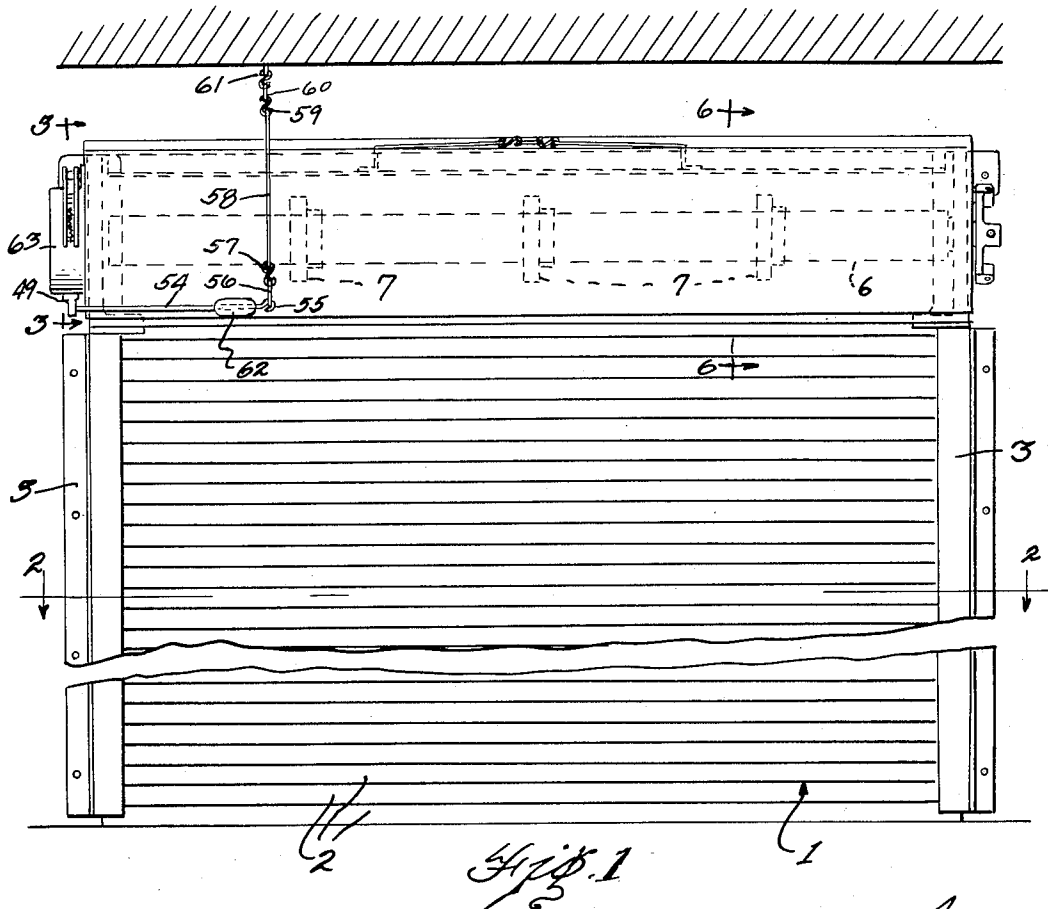
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GOVERNOR FOR CLOSURE MEMBERS

Filed Dec. 23, 1931

3 Sheets-Sheet 1



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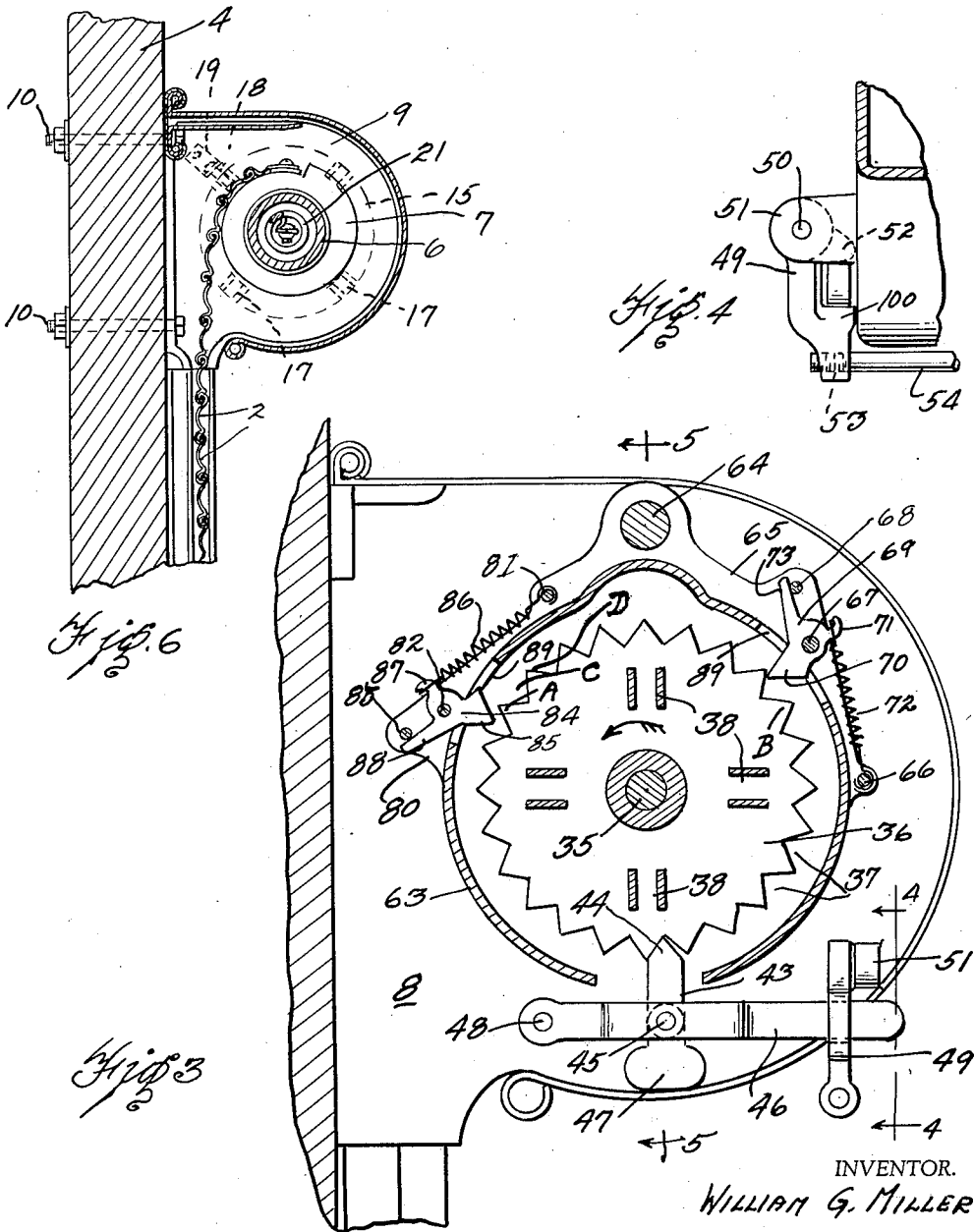
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GOVERNOR FOR CLOSURE MEMBERS

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3 Sheets-Sheet 2



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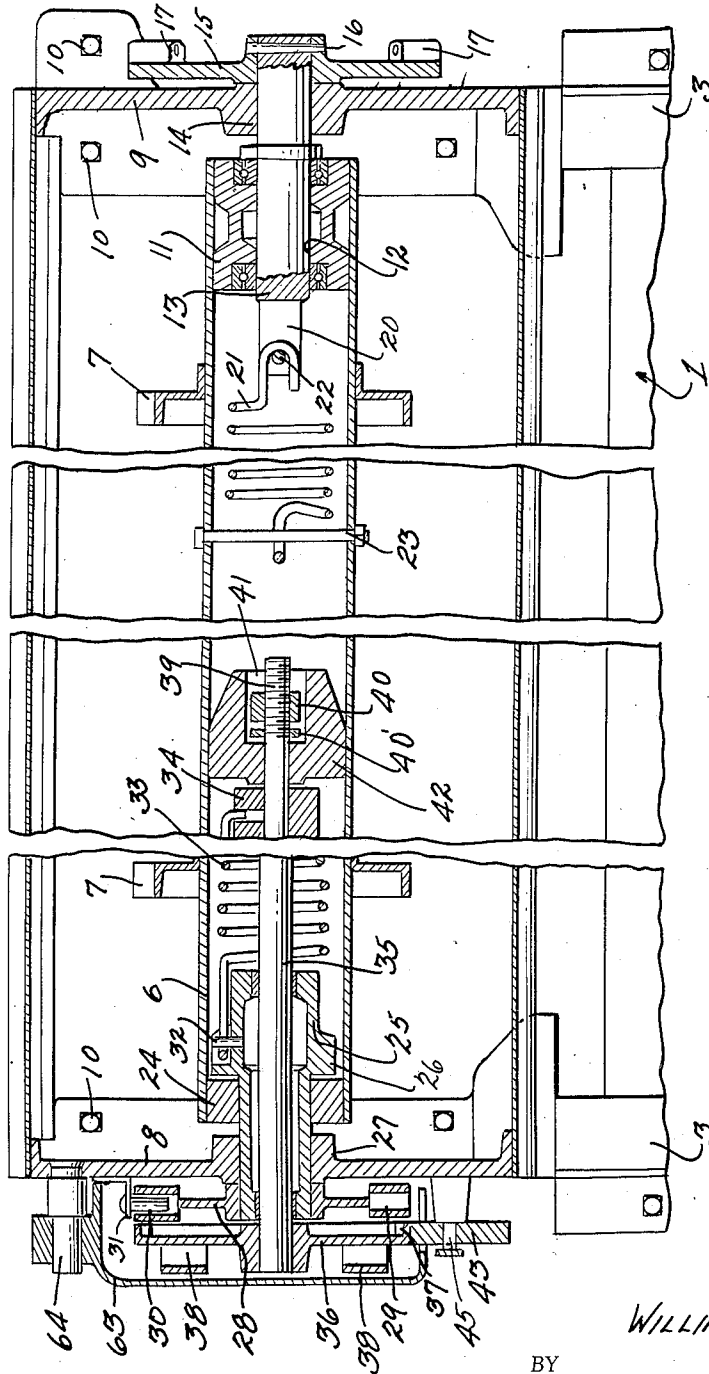
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3 Sheets-Sheet 3



*Fig. 5*

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## UNITED STATES PATENT OFFICE

2,019,085

## GOVERNOR FOR CLOSURE MEMBERS

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6 Claims. (Cl. 189—57)

This invention relates to escapement governor mechanism for closure members and is more particularly adapted for use with rolling steel fire shutters and the principal object and feature of the invention is in the provision of a device of this character which will automatically govern the speed of descent of the closure member to prevent injury to anyone who might be caught beneath the lower edge of the door as it lowers.

Another object of the invention is in the provision of a closure member provided with an escapement governor for regulating the speed of descent of the door and latching means for holding the door in its open or raised position and thermally controlled means whereby the latching means is disengaged to permit lowering of the door in the presence of fire.

A still further object of the invention is in the provision of means for positively disengaging the latching means to permit descent of the door.

These objects and the several novel features of the invention are hereinafter more fully described and claimed and the preferred form of construction by which these objects are attained is shown in the accompanying drawings in which—

Fig. 1 is an elevational view of my improved door in the closed position.

Fig. 2 is a section taken on line 2—2 of Fig. 1.

Fig. 3 is a section taken on line 3—3 of Fig. 1.

Fig. 4 is a section taken on line 4—4 of Fig. 1.

Fig. 5 is an enlarged section taken on line 5—5 of Fig. 3.

Fig. 6 is a section taken on line 6—6 of Fig. 1.

Referring to the drawings, the shutter or door 1 is formed of a plurality of interlocking plates 2 the edges of the same being guided in the channels 3 secured to the face of the wall 4 having the opening 5 therein adapted to be closed by the door 1. A tube or pipe 6 has the spaced members 7 suitably secured thereto and the upper edge of the door is suitably secured to these respective members. The end plates 8 and 9 are secured to the face of the wall 4 by means of the bolts 10 and the plate 8 is positioned adjacent one end of the pipe 6 while the plate 9 is positioned adjacent the opposite end. The end of the pipe 6 adjacent the end plate 9 has the bushing or bearing 11 pressed in one end thereof and is provided with the longitudinally extending aperture 12 in which is positioned the shaft or rod 13, the outer end of the rod being supported in the bearing portion 14 provided in the end plate 9 and the extreme outer end of the rod has the adjusting wheel 15 secured thereto by means of the pin

16. The adjusting wheel 15 is formed with the spaced sockets 17 and a pin 18 carried by the stationary bracket 19 is positioned in one of the sockets and holds the adjusting wheel from rotation.

The inner end of the rod 13 is bifurcated at 20 to receive one end of the spring 21, the same being held in the bifurcation by means of the bolt 22. The opposite end of the spring 21 is held by the bolt 23 extending through the pipe 6. It will thus be seen that by removing the pin 18 and rotating the adjusting wheel 15 any desired tension may be set up in the spring 21 and then by placing the pin 18 in one of the sockets 17 the spring 21 will be prevented from unwinding, except as later described. The end of the pipe 6 adjacent the end plate 8 has the ring 24 pinned or otherwise secured therein. A sleeve like member 25 is formed with the shoulder 26 which abuts the inner face of the ring 24. The intermediate portion of the sleeve is supported in the bearing 27 formed in the end plate 8 and the extreme outer end of the pipe has the adjusting wheel 28 suitably secured thereto, the same being provided with a plurality of sockets 29 in one of which the pin 30 is inserted the same being carried by the bracket 31 secured to the end plate 8. The inner end of the sleeve 25 is provided with a pin 32 to which one end of a spring 33 is secured, the opposite end of the spring being secured to the ring 34 secured to the rod 35, the rod extending through the sleeve 25 and the outer end of the rod having the serrated disc 36 secured thereto. The disc 36 is provided on its periphery with the notches or serrations 37 and on its outer face with the sockets or pockets 38.

The inner end of the shaft 35 is threaded at 39 to engage the nut 40 and the washer 40' positioned in the squared recess 41 in the member 42 the same being pinned or otherwise secured in the pipe 6. It will thus be seen that by removing the pin 30 from the bracket 31 and the socket 29 in which it engages that the proper tension may be placed on the spring 33 by rotating the adjusting wheel 28 and then by placing the pin 30 in one of the sockets 29 the spring 33 will be maintained at its proper tension and that by inserting a tool in one of the pockets 38 of one of the discs 36 and then rotating the same the nut 40 may be properly positioned on the threaded end 39 of the rod 35. A latching member 43 is provided with an end 44 of suitable shape to engage in one of the notches 37 in the periphery of the disc 36 and the latching member is pivotally connected at 45 to a bar 46.

and the lower end of the latching member is formed with the enlarged weighted end 47 so that the end 44 is always in position to engage in one of the notches 37. The bar 46 is pivotally connected at 48 to the end plate 8. A member 49 is pivotally connected at 50 to an ear 51 extending from the face of the end plate 8 and is provided with a lug or cam 52 engaging over the upper edge of the bar 46 and a portion 100 for engaging beneath the bar to hold the latch 43 in engagement with the disc 36.

The lower end of the member 49 is provided with a threaded aperture 53 for receiving one end of the rod 54. The opposite end of the rod 54 has the link 55 connected thereto and a fusible member 56 is connected to the link 55 and a second link 57 is likewise connected to the fusible member 56 and a chain, cable or rod 58 has its lower end connected to the link 57 and its upper end connected to the link 59 that in turn being connected to the fusible member 60 the same being connected to the link 61 suitably secured to the ceiling of the building. A weight 62 is positioned on the rod 54 adjacent the end connected to the link 56. It will thus be seen that in case of fire that either or both of the fusible members 56 or 60 will fuse or melt and will permit the end of the bar 54 carrying the weight 62 to drop down pivoting about the pivot 50. The lug or cam 52 will press against the upper edge of the bar 46 and move the latching member 43 downward so that the end 41 thereof will move out of engagement with the notches 37 and will permit the closure member to lower. A casing or cover 63 of cup-shaped form is pivotally connected on the pin or stud 64 secured adjacent the upper edge of the end wall 8. The cover is provided on its wall with a pair of spaced flanges 65 between which the pins 66, 67 and 68 extend. A pawl 69 is pivotally mounted upon the pin 67 and is provided with a tapered end 70 for engaging one of the notches 37 and is further provided with the hooked portion 71 to which one end of the spring 72 is attached, the opposite end of the spring being attached to the pin 66.

The pawl 69 is further formed with an extension 73 which is adapted to strike against the pin 69 and limit the upward movement of the end 70 of the pawl. The opposite side wall of the cover 63 is provided with a pair of spaced flanges 80 between which the pins 81, 82 and 83 extend. A pawl 84 is pivotally mounted upon the pin 82 and is provided with the tapered end 85 for engaging one of the notches 37 in the disc 36. A spring 86 has one end secured to the pin 81 and has its other end secured to the hooked portion 87 of the pawl. The pawl is further formed with the extension 88 which abuts the pin 83 and limits the downward movement of the tapered end 85. It will be understood, of course, that suitable apertures 89 will be provided in the side wall of the cover for permitting the respective pawls 69 and 84 to extend therethrough to engage the teeth in the disc 36 and the cover will be further provided with an aperture through which the latching member 43 extends.

The operation of this portion of the device is as follows: When either of the fusible members 56 or 60 are melted or fused the weight 62 will cause the rod 54 to drop down thereby disengaging the latching member 43 from the disc and the spring 21 acting on the bolt 23 will cause the disc 36 to rotate in a counter-clockwise direction or in the direction of the arrow shown in Fig. 3 and the high point A of the disc 36 will

strike against the end 85 of the pawl 84 and will swing the cover member about the pivot 64.

The high point B will at this time move toward the end 70 of the pawl 69 and will strike thereagainst and the cover 63 will be swung to the right whereupon the end 85 of the pawl 84 will engage in the notch C and when the high point D strikes against the end of the pawl the cover will again be swung to the left and this continuous cycle of operation will take place until the shutter is completely lowered. The spring 33 will be wound up as the door descends as the member 42 will be rotated with the pipe 6 and will thread the nut 40 on the rod 35 until the nut jams against the washer 40' in the bottom of the recess 41 as the ring 34 is secured to the rod and carries one end of the spring 33 while the opposite end of the spring is held by the stationary member 25. It will thus be noted that the shutter or door will lower relatively slow to prevent injury to anyone who happens to be beneath the door as it descends and likewise the door may be easily held at any point in its descent and when released is free to continue its downward movement. When the door is completely lowered and in the event anyone is trapped in the building it is only necessary to grasp the bottom of the door and raise the same a distance sufficient to pass therebeneath.

From the foregoing description it becomes evident that I have provided a novel and efficient escapement governor for closure members which will automatically retard the speed of descent of the closure member to prevent injury to anyone caught therebelow.

Having thus fully described my invention, its utility and mode of operation, what I claim and desire to secure by Letters Patent of the United States is—

1. In a device of the character described, a closure member, a winding drum therefor, an escapement governor for controlling the speed of descent of the same comprising a serrated disc attached to the drum, a pivoted support, a pair of approximately oppositely disposed latches for alternately engaging the teeth of the disc on opposite sides, gravity actuated latching means for engaging the serrated disc to prevent rotation thereof and relieve the escapement governor from pressure engagement with the disc, thermally controlled means for holding the latching means in engagement with the serrated disc, said means designed to release the latching means in the presence of fire to allow the latching means to fall by gravity under restraint of the escapement governor.

2. In a device of the character described, a closure member including a roller, a serrated disc attached to the roller, an escapement governor associated with the disc and positioned adjacent one edge of the closure member, for controlling the speed of descent of the closure member, gravity actuated latching means for engaging the serrated disc to prevent rotation thereof, thermally controlled means for holding the latching means in engagement with the serrated disc, said means designed to release the latching means in the presence of fire to allow the latching means to fall by gravity under restraint of the escapement governor, and a second latching means for assisting movement of the first latching means to its unlatched position.

3. In a device of the character described, a closure member, a winding drum therefor, an escapement governor including a serrated disc,

an oscillating member, a pair of escapement  
pawls carried by the oscillating member and suc-  
cessively engaging the disc as the member oscil-  
lates, means connecting the serrated disc to the  
5 winding drum whereby rotation of the drum will  
rotate the disc, the escapement pawls so arranged  
relative to the serrated disc as to govern the  
speed of rotation of the same, a latch device nor-  
mally engaging the disc to prevent rotation there-  
10 of, and thermally controlled means for holding  
the latch in engagement with the disc.

4. The combination with a curtain receiving  
drum, a serrated element driven by the unwind-  
ing movement of the drum, an oscillating mem-  
15 ber including a dog mounted therein to inter-  
mittently engage the serrated member and per-  
mit interrupted descent of the curtain, a second  
dog adapted for engagement with the serrated  
element to hold the same from rotation and re-  
20 lieve the oscillating member from pressure en-  
gagement therewith, a weighted lever tending  
at all times to disengage the second dog, and  
thermally controlled means for holding the said  
second dog in engagement with the serrated ele-  
25 ment to prevent rotation thereof.

5. The combination with a curtain receiving  
drum, a serrated element driven by the unwind-  
ing movement of the drum, a member freely oscil-  
latable at all times including a dog carried there-  
30 by to intermittently engage the serrated member

and permit interrupted descent of the curtain,  
a pivoted lever, an additional dog pivotally  
mounted on said lever and movable thereby to  
engagement with the serrated element, a second  
5 pivoted lever tending by gravity to hold the first  
named lever with the additional dog out of en-  
gagement with the toothed element, and ther-  
mally controlled means for holding said second  
lever in position to maintain the additional dog  
in engagement with the serrated element to pre-  
10 vent rotation thereof.

6. In a device of the character described, a  
closure member, a winding drum therefor, an  
escapement governor including a serrated disc,  
an oscillating member, and a pair of escapement  
15 pawls carried thereby, means connecting the ser-  
rated disc to the winding drum whereby rotation  
of the drum will impart movement to the disc,  
the escapement pawls being so arranged relative  
to the serrated disc as to govern the speed of  
20 rotation of the same, latching means adapted to  
engage the serrated disc to prevent movement  
of the same, thermally controlled means for hold-  
ing the latching means in engagement with the  
serrated disc, a cam engaging the latching means  
25 and operable by release of the thermally con-  
trolled means to force the latching means out  
of engagement with the serrated disc.

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