June 2, 1925. **1,540,647**

F. W. PARSONS

FIRE DOOR CONTROL

Filed June 26, 1922 3 Sheets-Sheet 1

Fig. 1

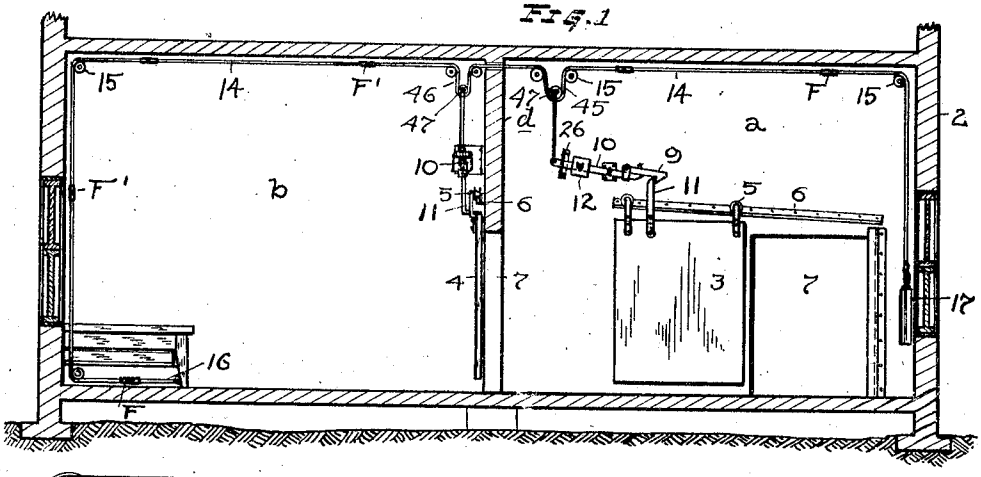
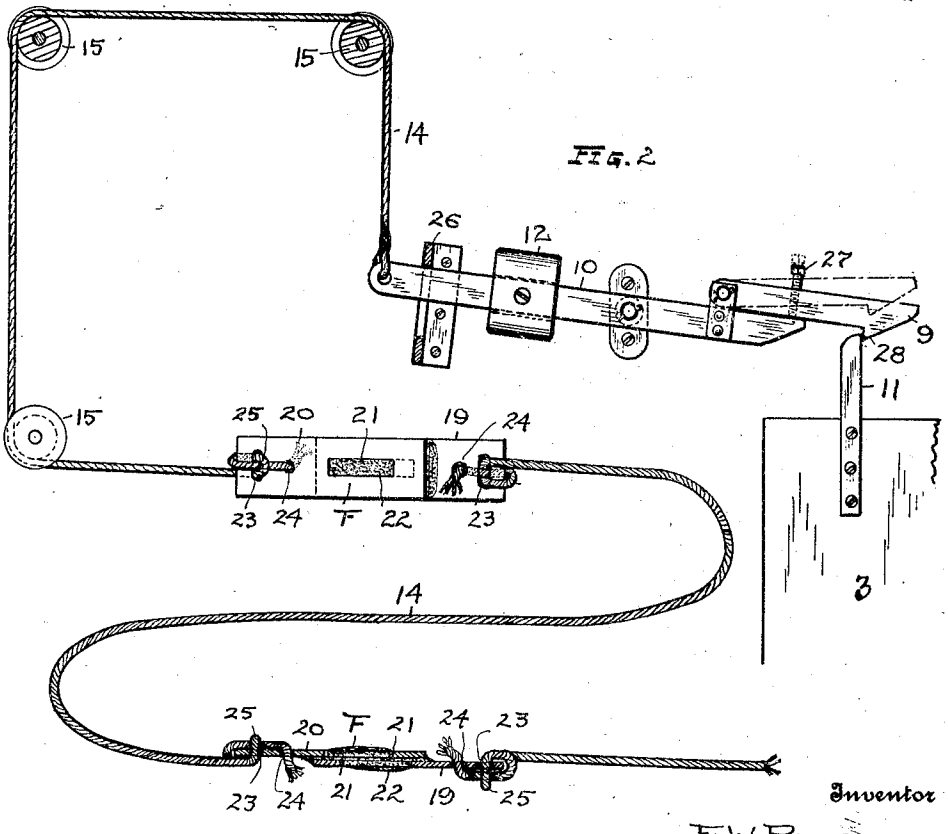


Fig. 2



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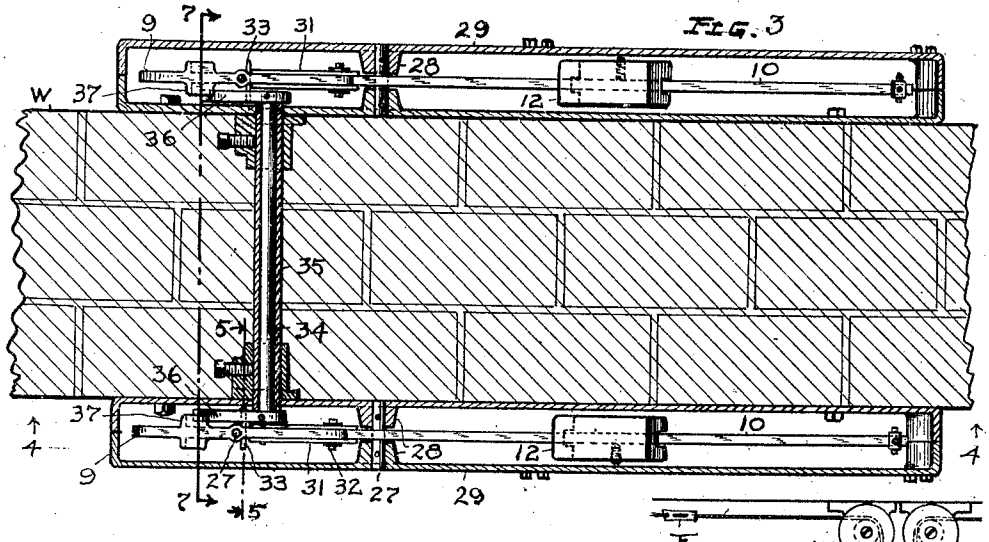


Fig. 3

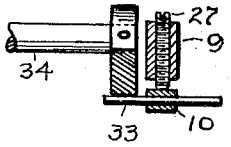


Fig. 5

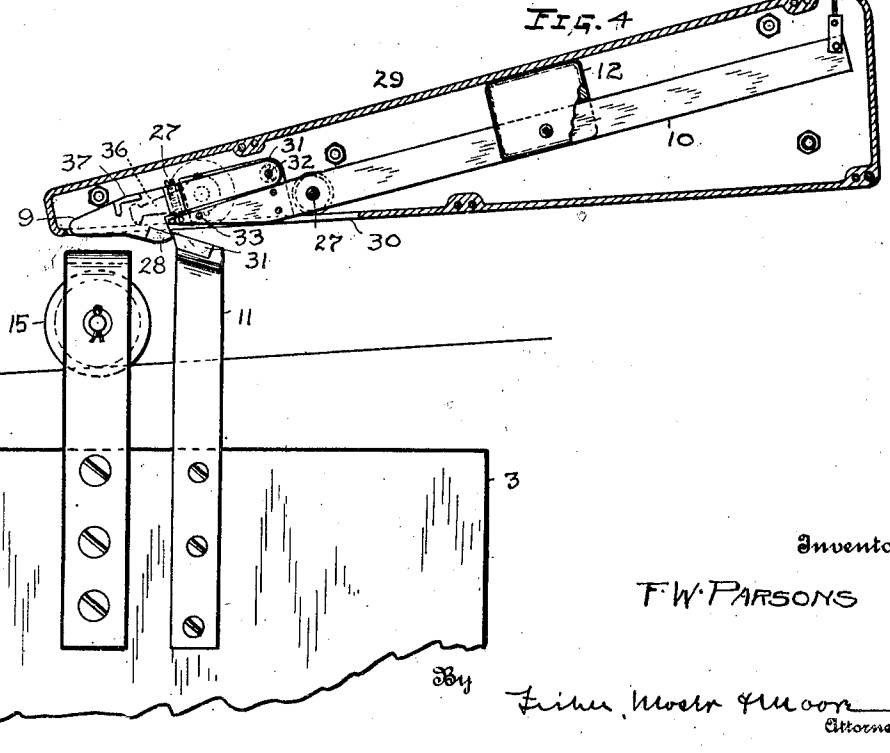


Fig. 4

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FIRE DOOR CONTROL

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Fig. 6

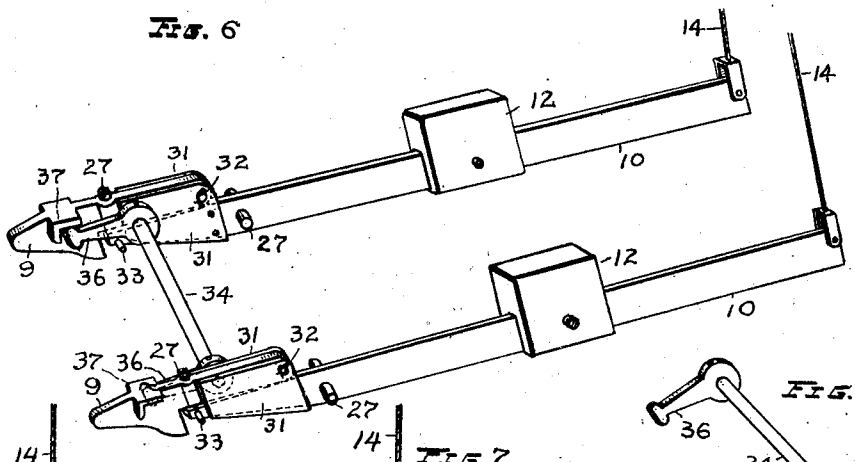


Fig. 8

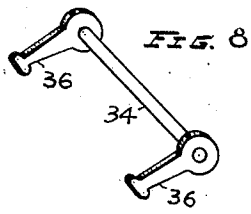


Fig. 7

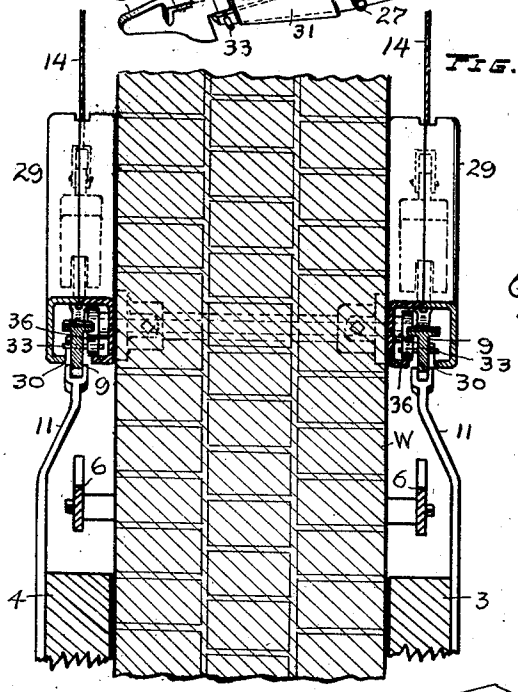


Fig. 9

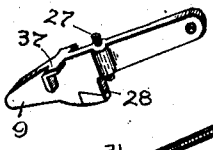


Fig. 10

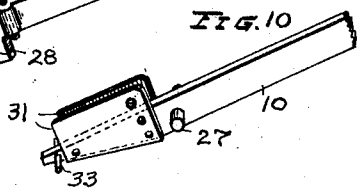
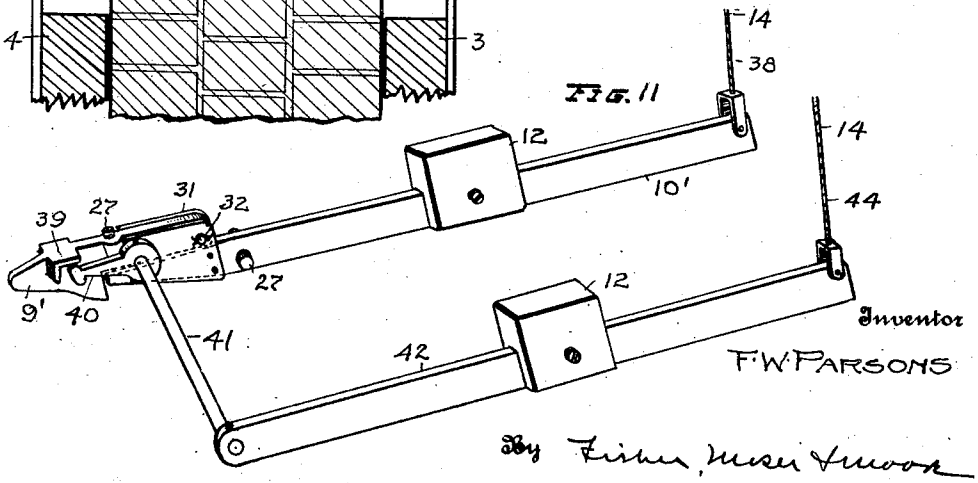


Fig. 11



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Patented June 2, 1925. 1,540,647

UNITED STATES PATENT OFFICE.

FREDERICK W. PARSONS, OF CLEVELAND, OHIO.

FIRE-DOOR CONTROL.

Application filed June 26, 1922. Serial No. 571,061.

To all whom it may concern:

Be it known that I, FREDERICK W. PARSONS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Fire-Door Controls, of which the following is a specification.

This invention pertains to fire doors, the general object being to provide sensitive latch and thermal control instrumentalities or appliances adapted to effect automatic closing of one or more doors on the outbreak of a fire in a building or other place equipped with such appliances. A further object is to provide a tripping device in connection with such appliances adapted to permit a fire door to be opened and closed without affecting the setting or automatic operation thereof.

Another object is to provide separate latch and thermal control appliances for a pair of doors, these appliances being operatively associated and connected to effect conjoint closing of the doors whenever either control appliance is influenced actively. Still another object is to provide the tripping latch for each fire door with a control cable having a multitude of fusible sections in its length to establish many definite fire zones in the building so that parting of the cable may quickly take place in any one of them whether near or remote from the door and cause immediate closure of the door before the fire spreads.

In the annexed drawings, Fig. 1 is a sectional view of a building showing my invention installed therein in operative connection with a pair of fire doors. Fig. 2 is an enlarged side view of a short portion of a control cable constructed according to my invention and also showing a simple form of tripping device engaged with a detent arm on a section of a fire door.

Fig. 3 is a horizontal section of a fire wall and a pair of my improved co-acting tripping devices mounted upon opposite sides thereof.

Fig. 4 is a side view and section on line 4—4 of Fig. 3, this view also showing a corner section of a fire door and its detent arm.

Fig. 5 is an enlarged sectional view of a detail of the tripping device and associated parts on line 5—5 of Fig. 3.

Fig. 6 is a perspective view of a pair of my improved tripping devices and the oscillatory connecting shaft used therewith, bearing parts being omitted.

Fig. 7 is a vertical section on line 7—7 of Fig. 3, showing the tripping devices in opposite sides of the fire wall and a portion of the fire doors and the tracks for the doors.

Fig. 8 is a perspective view of the oscillatory shaft alone, and Figs. 9 and 10 are similar views of the tripping catch or pawl and the lever for the pawl, respectively. Fig 11 is a perspective view of a modified form of the invention.

In Fig. 1, I show a building 2 in which separate fire doors 3 and 4 are suspended from rollers 5 riding on inclined tracks 6 above door-ways or passages 7 in the walls of the building. These doors are adapted to close by gravity when pivoted catch or pawl 9 on a pivoted tripping lever 10 is raised and disengaged from a vertical detent arm 11 fixed on each door. A weight 12 adjustably mounted upon the longer arm of lever 10 tilts the lever and releases the catch whenever a relatively long thermal cable 14 attached to one end of the lever either parts or slackens at any point in its length. This cable is suspended in free running engagement with sheaves or pulleys 15 mounted on the walls or ceilings of the building and the idea is to extend this cable for long distances back and forth through the work rooms, storage places, etc., in the building and to either anchor the far end or extremity 16 of the cable or to suspend a heavy weight 17 therefrom or to do both as shown in Fig. 1, the object being to keep the cable taut and the tripping catch engaged under normal conditions. The cable comprises fusible sections or links F at intervals of six to ten feet throughout its length to effect parting of the cable in the event of an outbreak of fire in the immediate zone of any one of these fusible sections F. As shown in Fig. 2 the fusible sections comprise two flat strips 19 and 20 of metal having elongated openings 21 in their end

portions which are adapted to be overlapped and united together by fusible solder 22 applied within the openings and between the meeting faces of the strips. Each plate or strip is also formed with a transverse slot 23 and a round opening 24 centrally opposite this slot, whereby the wire cable end may be looped through the slot and passed around the end portion of the strip and thence through the loop 25 and finally at right angles through round opening 24. This tie or knot secures the cable firmly to the opposite ends of the fusible section F, but detachably and so that take-up or allowance can be made conveniently at any one of the fusible sections in the whole cable. The degree of fusibility of the solder may vary in the different fusible sections in the same cable; that is the solder in some of the fusible sections for a portion of the length of the cable where passing through one room in the building may be of a lower or higher degree of fusibility than the fusible sections in another portion of the cable in another room of the building, so that parting of the cable may occur at different temperatures in different areas or zones in the same building where different conditions exist. Thus in room *a* of building 2 the fusible sections F may comprise solder fusible at a low temperature, and in the work room *b* the solder in sections F′ may be fusible only at higher temperatures. In either case when fusion and separation occurs at any one of the sections F, the weights on the levers will trip both catches and release both fire doors 3 and 4. A stop member 26 limits the tilting movement of the lever, and a set screw 27 extends through the catch 9 pivoted upon the upper side of the short arm of the lever 10 to permit a sensitive adjustment of the catch point or hook 28 with the engaging end of the detent arm 11 on the door. In this way, it is possible to check self-closing of the fire door and also permit the door to be opened and closed by hand without disturbing the set position of the tripping lever. That is to say, the holding engagement of catch and detent may be made so sensitive that a slight jar or movement of the door may kick the catch 9 upward and permit the door to be closed by hand without disturbing the normal operating position of the main lever 10. In opening the door the detent arm 11 engages the beveled end of the catch and lifts it up until locking is effected the pivoted catch 9 being free to move upwardly without any change in position of the main lever 10.

In some installations a fire door is desired or required upon opposite sides of a fire wall, and in Figs. 3 to 10, inclusive I show separate tripping devices and separate fusible cables on opposite sides of the fire wall adapted to control the closing of a pair of doors for a single door-way in the fire wall. Briefly, the object here is to close both doors simultaneously upon the parting of or slack in either cable. The same tripping lever, catch and detent arrangement is used in general as hereinbefore described, and like parts bear like designating numerals, but these devices are supplemented by other parts and housed in separate casings as follows: The main lever 10 is mounted upon a pivot pin 27 between bosses 28′ extending inwardly from the opposite sides of the separable halves of a divided casing 29 having an opening 30 in its bottom through which catch or pawl 9 is adapted to project to permit engagement with the hardened inset hook 28 of detent arm 11 on the door, see Fig. 4. The short arm of the lever is tapered and faced on opposite sides by thin plates 31 which provide vertical guides for the pivot end of catch or pawl 9, and the pivot pin 32 on the catch passes through these side plates above and relatively near the pivot pin 27 of lever 10. The set screw 27′ carried by the catch or pawl bears upon the top of the extremity of the short arm of the lever, and a cross pin 33 extends horizontally through the same extremity of the lever, see Figs. 5 and 6. Thus, when weight 17 is permitted to tilt the lever the catch 9 and the cross pin 33 rise together. This pin is utilized to oscillate a cross shaft 34 rotatably mounted within bearings and a sleeve 35 embedded within wall W, said shaft having a short finger 36 at each end where projected into the casing and each finger resting normally upon the pin of the lever next or adjacent thereto, see Fig. 3. The rounded extremity of each finger 36 is also located immediately beneath a lateral lug 37 on the catch 9 of a corresponding lever so that the tilting action of one lever will cause uplift of both catches 9—9 on opposite sides of the wall without moving or affecting the set position of the other lever. To explain further, say one cable parts at any point in its length and permits the lever with which it is connected to be tilted by the weight on the long arm of the lever. As this occurs the main lever and cable on the opposite side of wall W are unaffected, but nevertheless both catches or pawls 9—9 on opposite sides of the wall will be lifted to release both doors simultaneously because the cross pin 33 on the tilting lever raises the adjacent finger and rotates the cross shaft and the other finger thereon in like degree and therethrough the other catch in like degree. This double releasing action of the two doors is therefore effected if either cable parts or gets slack.

In Fig. 11 I show a modified form of double-acting tripper arrangement controlled by two fusible cables 38 and 44, respectively. In this form of the invention

a main tilting lever 10′ having a pivoted door check or catch 9′ is upheld by a thermal control cable 38. The catch has a lateral lug —39— which is adapted to be engaged and lifted by a finger —40— fixed on an oscillating shaft —41—. This shaft is intended to be supported in bearings and to extend through a wall in substantially the same way as illustrated in Figs. 3 and 7, and to be provided with a weighted auxiliary lever 42 at the opposite side of the wall. Lever 42 is fixed to the cross shaft and a second thermal control cable 44 is connected with the free end thereof to uphold it and prevent the cross shaft from turning. Assuming cable 44 to be parted at some place in its length the weighted lever 42 would drop and finger 40 would move upwardly and lift the catch 9′. On the other hand, if the main lever 10′ were to drop because of the parting of its thermal control cable 38 the catch 9′ would be raised by the tilting of lever 10′ and the door would be released to close by gravity. In Fig. 1 I show two doors and two independent tilting levers and catches controlled by a single thermal cable extending through two rooms in a building and passing through a division wall *d*. An edge view of one door and its controlling device is shown adjacent wall *d*, and the other door and device is a side view. The single cable in this instance has depending loop portions 45 and 46 in which wheeled hanger connections 47 are provided for the respective tilting levers. If the cable parts in either room the weighted levers will both drop and release the two doors concurrently.

As shown the invention is applied to a sliding door, but it is also applicable to swinging doors, trap doors, windows, and other fire closures or safety devices.

What I claim, is:

1. A self-closing fire-door, detent means for said door, separate pivoted levers and separate fusible cables connected to said levers, each cable being under tension to hold the separate levers and said detent means in detaining position for said door, and either lever being adapted to release said detent means.

2. A self-closing fire-door, a pivoted lever having a pivoted hook mounted upon one end thereof adapted to hold the door open, and a thermal control cable connected with the opposite end of said lever and suspended under tension having a series of fusible places at spaced intervals therein.

3. A self-closing fire-door, a weighted lever having a pivoted hook at one end thereof adapted to hold the door open and a set screw to adjust said hook, and a fusible control cable connected with said lever.

4. A self-closing fire-door, a pivoted lever having a sensitive gravity tripping hook pivoted upon one end thereof adapted to permit the door to be closed and opened by hand and to hold the door open, and a fusible cable connected with said lever adapted to effect automatic tripping of said device and release of said door.

5. A self-closing fire-door having a detent member, a pivoted lever having a pivoted catch, a set screw mounted upon one of said parts adapted to adjust the working relations between said catch and detent member, and a flexible fusible connection for said lever adapted to hold the lever and catch in a predetermined working position.

6. A pair of self-closing fire doors located upon opposite sides of a wall, separate latch and thermal control appliances for each door, including means comprising a rock shaft between the latches to effect conjoint movement of both latches and closing of the doors whenever either control appliance is influenced actively by fire or heat.

7. A pair of self-closing fire doors, a movable detent device for each door, a fusible control element adapted to hold each device in detaining position and means interposed between said devices adapted to actuate and release both of said devices upon the fusing of the control element of either device.

8. A pair of self-closing fire doors, a tripping detent for each door, a fusible cable connected under tension with each tripping detent, and an operative connection between said detents adapted to actuate both detents to release the doors when the tension of either cable is relaxed.

9. A pair of self-closing fire doors contiguously related, a tripping detent for each door, a fusible connection for each detent adapted to hold them actively in position, and an oscillatory device adapted to produce conjoint action of said detents when either fusible connection becomes inactive.

10. A pair of self-closing fire doors, a pivoted lever and movable catch for each door, a fusible cable connected with said levers, and an oscillatory device dependent for movement upon said levers and engageable with said catches alternatively.

11. A controlling device for fire doors, comprising a pair of pivoted levers, a pivoted catch upon each lever, an oscillatory shaft having means engageable with said catches, and each of said levers having means adapted to actuate said shaft.

12. A controlling device for a fire door, comprising a pair of pivoted levers, a fusible connection for each lever, a catch carried upon one of said levers, and means connected with the other lever adapted to actuate said catch independently of its carrying lever.

13. A controlling device for a fire door, comprising a casing, a lever pivoted within said casing having a weight at one end and a gravity catch pivoted upon the other end of said lever, and a cable connected with the weighted end of said lever having numerous fusible sections in its length, in combination with a gravity fire door having a detent adapted to be engaged by said catch.

In testimony whereof I affix my signature.

FREDERICK W. PARSONS.