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Mitchell

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[54] **FIRE PROTECTION DEVICE FOR BUILDING STRUCTURE**
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 [21] Appl. No.: **154,515**

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Primary Examiner—Peter M. Caun
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[52] **U.S. Cl.** 160/84 R, 160/1
 [51] **Int. Cl.** A47h 5/032
 [58] **Field of Search** 160/1-6, 160/84 R, 229, 235, 32, 35; 52/64

[57] **ABSTRACT**

A fire protection device is described for unfurling a fire resistant curtain over the roof of a building structure to protect the structure from an adjacent fire.

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6 Claims, 14 Drawing Figures

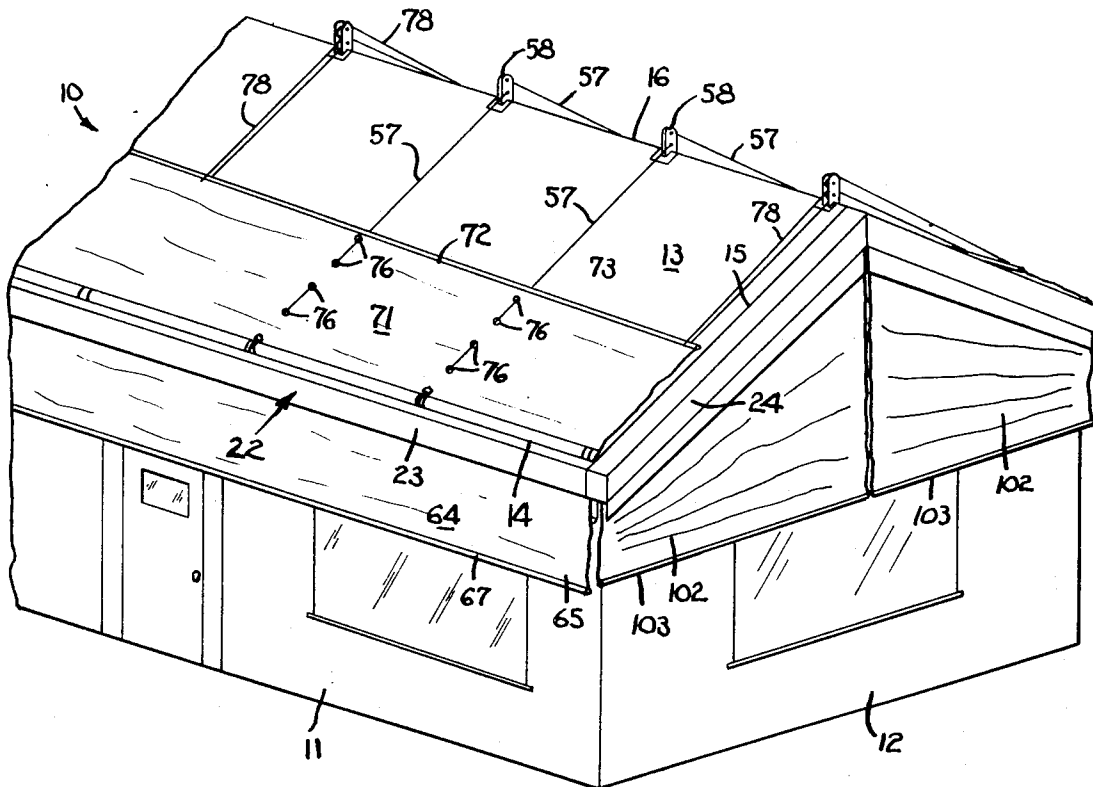


FIG. 1

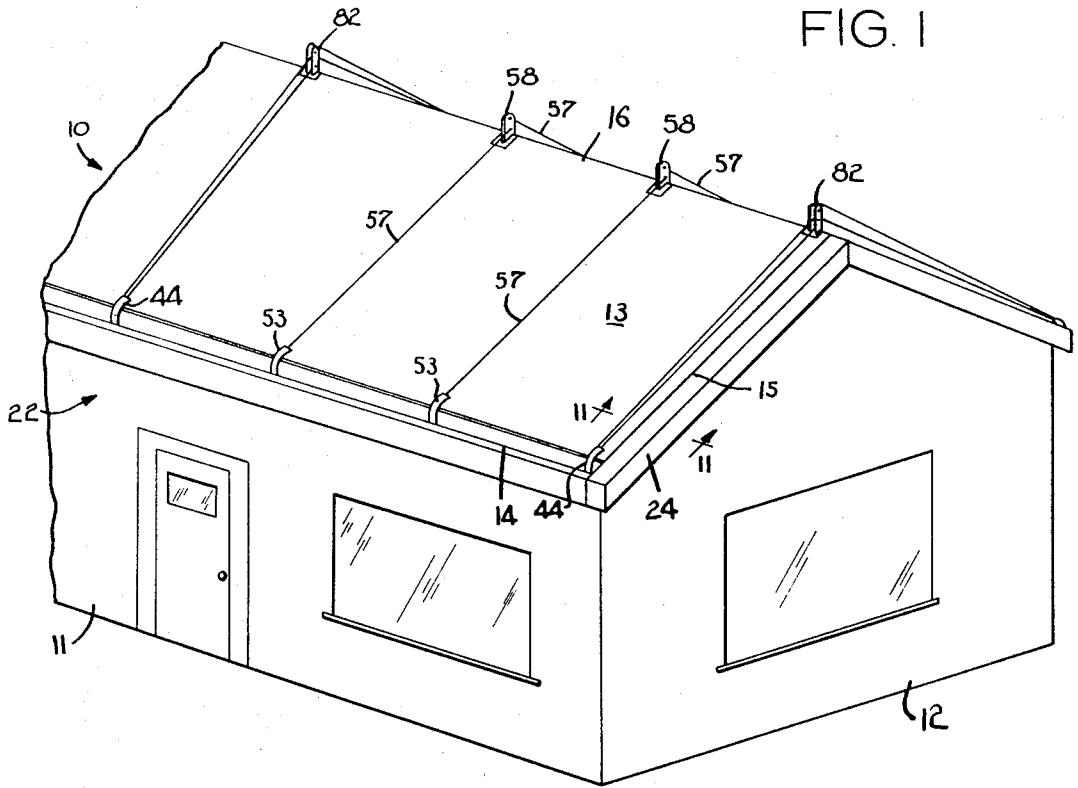
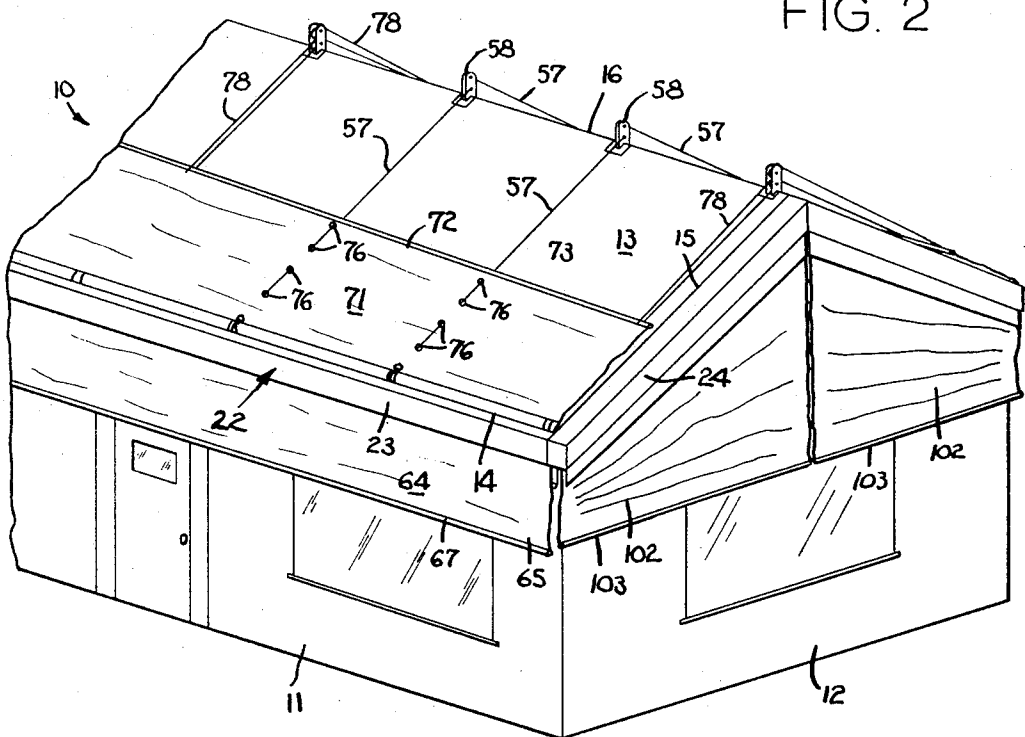


FIG. 2



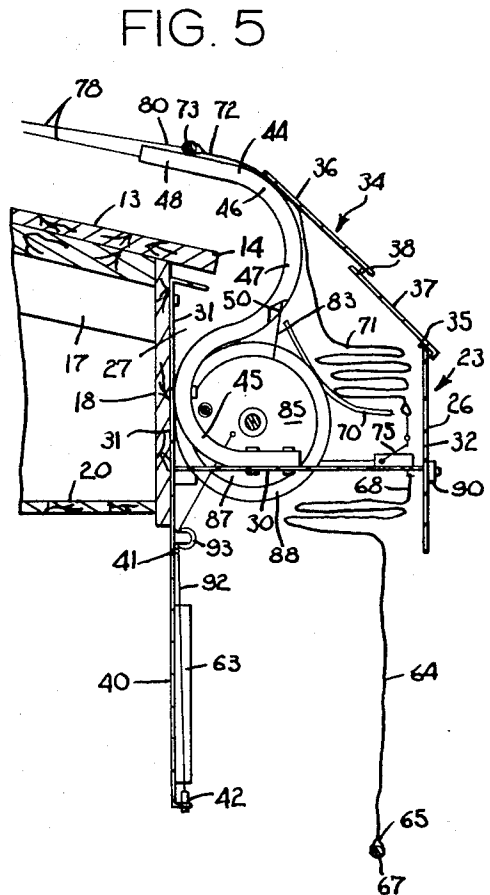
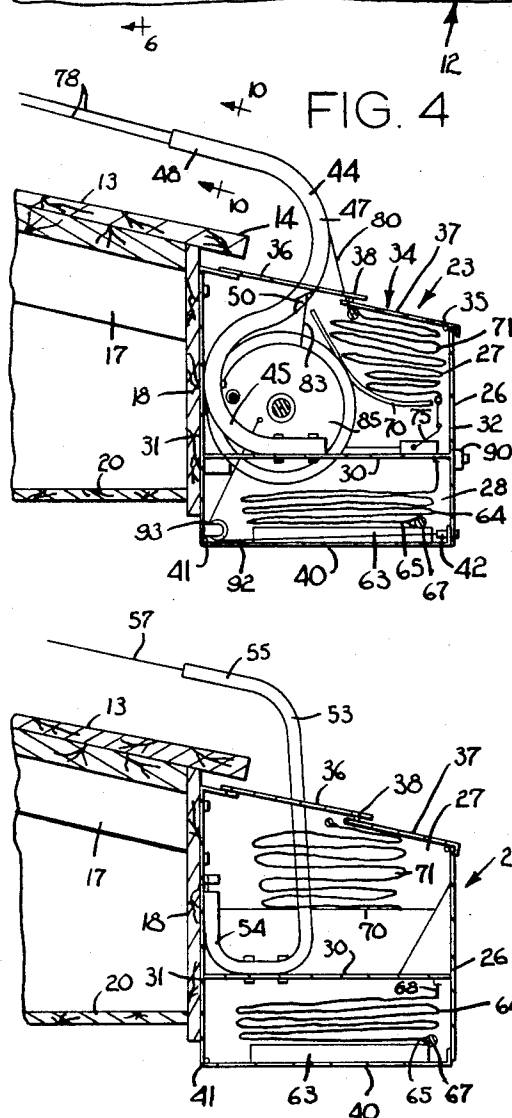
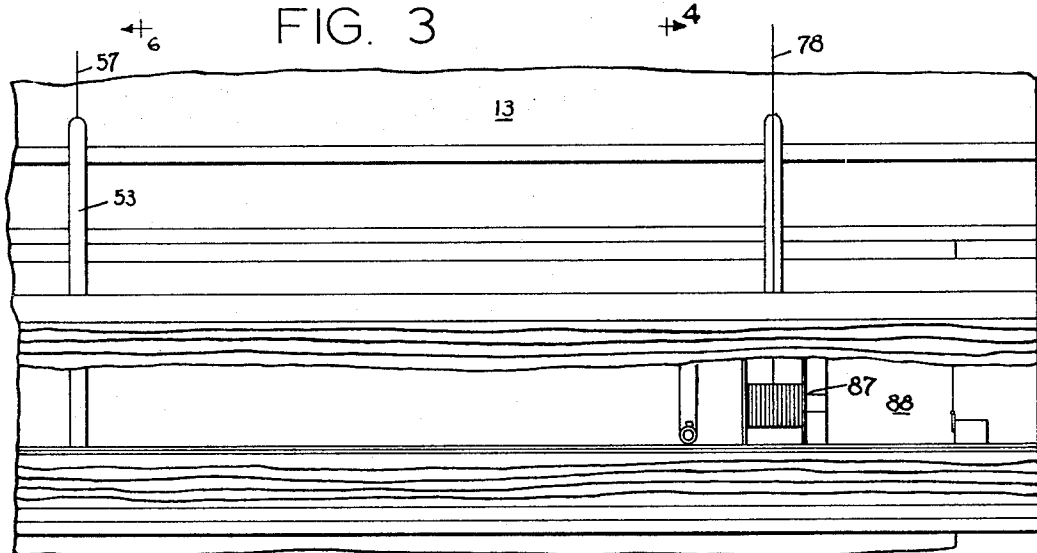


FIG. 6

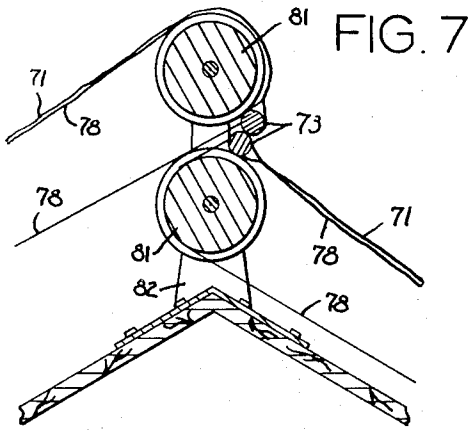


FIG. 7

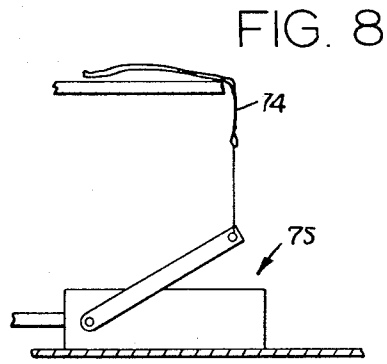


FIG. 8

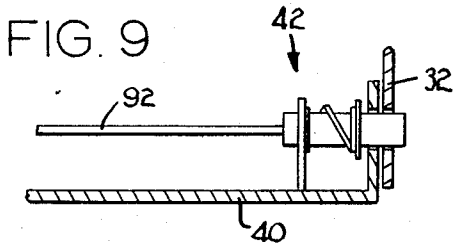


FIG. 9

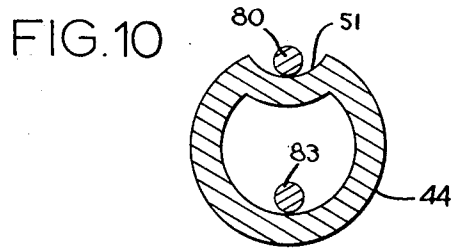


FIG. 10

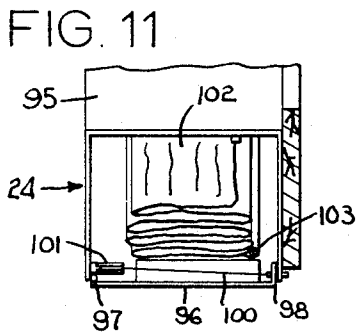


FIG. 11

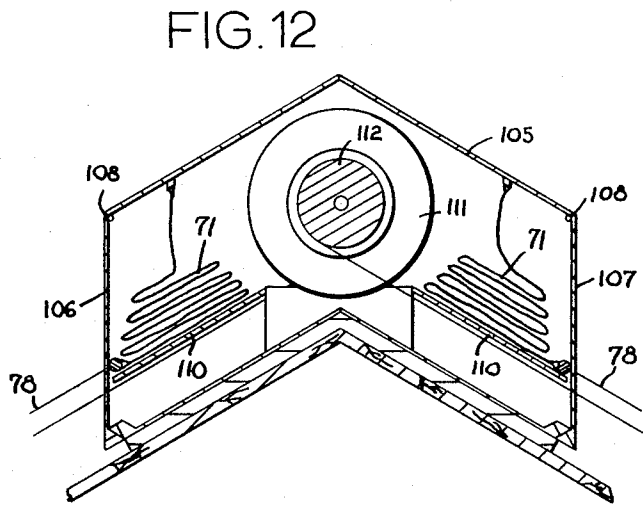


FIG. 12

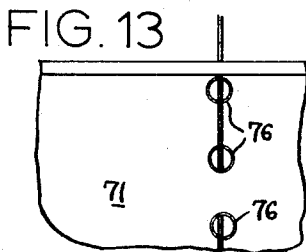


FIG. 13

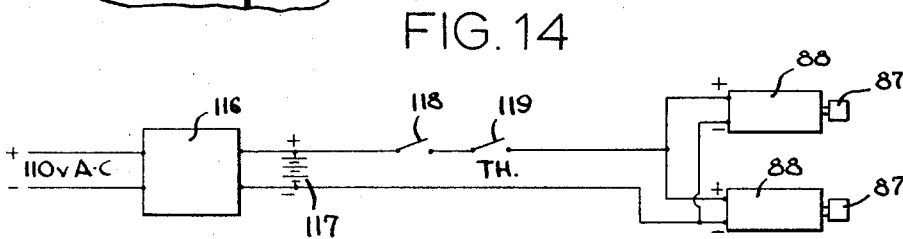


FIG. 14

FIRE PROTECTION DEVICE FOR BUILDING STRUCTURE

BACKGROUND OF THE INVENTION

This invention relates to fire protection devices and more particularly to fire protection devices for protecting a building structure from fires located adjacent to the building.

In dry seasons, it is not uncommon for many people to loose their homes that are located away from urban areas due to uncontrolled brush fires and forest fires.

Often the only fire protection that a farm house or rural building has is a water pump system which may be utilized for defending the structure against a raging fire. However, one of the principal problems that normally occurs with such a system is that the electrical power to the structure is frequently out of order and is unavailable precisely when it is most needed. Unless there is an auxiliary power supply handy the entire system is inoperative.

One of the principal objects of this invention is to provide a fire protection device for a building structure, particularly building structures that are located in rural areas away from the fire protective vehicles that is not dependent upon the availability of continuous electrical service.

An additional object of this invention is to provide a fire protective device for covering the building structure with a fire resistant curtain or blanket to protect the structure from sparks, flames and intense heat of a forest or brush fire.

A further object of this invention is to provide a fire protection device for a building structure that may be incorporated or attached to the building structure with little or no aesthetic detriment to the structure when the device is not in use.

These and other objects and advantages of this invention will become apparent upon the reading of the following detailed description of a preferred and alternate embodiment.

BRIEF DESCRIPTION OF THE DRAWINGS

A preferred and alternate embodiment of this invention is illustrated in the accompanying drawings, in which:

FIG. 1 is a perspective view of a building structure having a fire protection device affixed thereto, in which the fire protection device is shown in an inoperative condition;

FIG. 2 is a perspective view similar to FIG. 1 except showing the fire protection device being operated to enclose the building structure with a fire resistant material;

FIG. 3 is a fragmentary plan view of a section of a roof of the building structure illustrating a portion of the fire protection device;

FIG. 4 is a vertical cross-sectional view taken along line 4—4 in FIG. 3 showing the fire protection device in an inoperative or storage position;

FIG. 5 is a vertical cross-sectional view similar to FIG. 4 except showing the fire protection device in an operating condition;

FIG. 6 is a vertical cross-sectional view taken along line 6—6 in FIG. 3;

FIG. 7 is a fragmentary vertical cross-sectional view of the ridge of the roof of the building structure show-

ing an additional component of the fire protection device in detail;

FIG. 8 is an isolated vertical cross-sectional view of a switch mechanism for de-activating the fire protection device;

FIG. 9 is an isolated vertical cross-sectional view of a latch mechanism of the fire protective device;

FIG. 10 is a vertical cross-sectional view taken along line 10—10 in FIG. 4;

FIG. 11 is a vertical cross-sectional view taken along line 11—11 in FIG. 1;

FIG. 12 is a vertical cross-sectional view of an alternate embodiment of the fire protection device;

FIG. 13 is a fragmentary plan view of an isolated segment of a fire protective curtain; and

FIG. 14 is an electrical schematic view of an electrical system for operating protective devices.

DETAILED DESCRIPTION OF A PREFERRED AND ALTERNATE EMBODIMENT

Referring now in detail to the drawings, there is illustrated in FIG. 1 a building structure, more particularly a residential house, generally designated by the numeral 10. The particular structure 10 shown is very simple in design and construction and is shown only as an example. The applicant's invention can be utilized in conjunction with a variety of different shaped structures. The building structure 10 shown has side walls 11 and end walls 12 with a pitched roof 13. The pitched roof 13 has side edges 14 and end edges 15. The pitched roof 13 extends at an inclined angle from the side edges 14 upward to a ridge 16 in approximately the longitudinal center of the building structure. Along the side edges 14 of the house are eaves 17 (FIGS. 4-6) having a fascia 18 and soffit 20 enclosing the eaves 17.

This invention concerns a fire protection device generally designated by the numeral 22 for enclosing the structure with a fire protective blanket to prevent sparks, flames and the heat of the surrounding fire from burning or consuming the building structure. The fire protective device 22 includes side units 23 that extend along the side edges 14 and end units 24 that extend along the end edges 15 of the roof. Depending upon the size of the building structure more than two units 23 may be mounted along the side edges of the roof as may be required. Each of the side units 23 (FIGS. 4-6) includes an elongated enclosure or box 26 having an upper compartment 27 and a lower compartment 28. The upper compartment and the lower compartment are separated by a partition 30. The elongated enclosure includes a back wall 31 that is attached to the fascia 18 and a front wall 32 that runs parallel with the side edges 14 but spaced outward therefrom. The elongated enclosure has a lid or roof element 34 that is pivotally mounted to the front wall 32 by a hinge 35. The lid or roof element 34 has two pivotally interconnected sections 36 and 37 that are pivotally interconnected by a hinge 38. The section 36 has an end that extends underneath the side edge 14 of the roof so that rain or snow will slide or move down the roof 13 and over the roof element 34 and fall along the front wall 32 to the ground. If desired, a gutter may be mounted on the front wall 32 to catch the rain and melted snow. The hinge 38 acts as a knee to the sections 36 and 37 to enable the section 37 to pivot upwardly to pull the section 36 out from underneath the roof as the roof element is being opened.

The lower compartment 28 has a hinge door 40 that pivots downward with the door 40 being hinged to the back wall 31 at point 41. The door 40 is releasably opened through a latch mechanism 42.

The fire protection device 22 has an S-shaped guide tube 44 mounted at spaced locations in the elongated enclosure along the side edge 14. Each guide tube 44 has a lower end 45 affixed to the elongated enclosure 26 and an upper end 46 that extends upward through the roof element 34 and projects toward the roof ridge 16. The upper end 46 has a curve section 47 terminating in a straight end section 48. A hole 50 is formed through the wall of the tube 44 immediately below the curved section 47. A longitudinal support indentation or groove 51 (FIG. 10) is formed in the guide tube 15 along the top of the guide tube for supporting a wire therein.

The fire protection device 22 includes C-shaped guide tubes 53 (FIG. 3 and 6) that have lower ends 54 affixed to and supported by the elongated enclosure and an upper end 55 extending upward through the roof element 34 and projecting toward the ridge 16. The guide tubes 44 and 53 are spaced along the side edge 14. Stationary guide wires 57 extend from guide tubes 53 upward over the roof to a bracket 58 affixed 25 to the roof ridge 16 as illustrated in FIG. 1. One end of the guide wire 57 is affixed to the bracket 58 and the other end 61 of the guide wire 57 extends into the upper end 55 of the guide tube 53.

A curtain support 63 is mounted in the lower compartment 28 on the door 40. The support 63 supports a side curtain 64 that is stored folded back and forth upon itself in a compact manner. The curtain has free end 65 with a weight or bar 67 affixed thereto. Side curtain 64 has an end 68 that is affixed to the elongated enclosure. When the latch 42 is operated, the door 40 pivots downwardly allowing the curtain 64 to unfurl downward along the side walls 11 of the building structure to protect the side walls 11 from being damaged from an external fire.

A curtain support 70 is mounted in the upper compartment 27 for supporting a roof curtain 71 therein. The curtain 71 is folded back and forth upon the curtain support 70 in a compact manner when being stored. The curtain 71 has a free end 72 with a bar 73 affixed thereto. The other end 74 of the curtain 71 is operatively connected to a switch mechanism 75 (FIG. 8).

At specific locations in the curtain 71, grommets 76 (FIG. 2 and 13) are formed therein to receive the guide wires 57 and the guide tubes 53. In the folded storage condition, the curtain 71 is folded with the grommets 76 positioned about the lower end 54 of the guide tube 53.

Reeling wires 78 are mounted on the roof between the elongated enclosure 26 and the roof ridge 16 at spaced intervals corresponding to the guide tubes 44. Each of the reel wires 78 has one end 80 affixed to the bar 73 and extends upward in an upper flight over a pulley 81 mounted on a ridge bracket 82 (FIG. 7). The wire 78 extends back down the roof in a lower flight with an opposite end 83 (FIG. 4 and 5) extending through the upper end 46 of the guide tube 44. The end 83 extends through the hole 50 and is connected to an unfurling means or reel drive 85. In the inoperative or storage condition, the reeling wire end 80 resides in the longitudinal indentation or groove 51 (FIG. 10). The

reel drive 85 includes a reel 87 that is connected to a motor 88. The motor 88 may be operated by manual actuation or it can be energized by a temperature sensing device 90 (FIG. 4 and 5). When the temperature sensing device 90 senses an exterior temperature corresponding to that of a fire it will energize the motor 88 to rotate the reel 87. The reel 87 being connected to the wire end 83 causes the reel wire to be wound on the reel to lift the curtain end 72 upward with the bar 73 riding on the exterior of the guide tube 44. The bar 73, as it is moved upward lifts the roof element 34 upwardly about the hinge 35 to open the upper compartment of the elongated enclosure. Continued movement brings the curtain end 82 upward over the upper ends 46 and 55 of the guide tubes 44 and 53 respectively. The curtain end 72 is continually moved upward over the guide wires 56 and 78 until the end 72 reaches the pulley 81 as shown in FIG. 7. When the curtain end 72 reaches the ridge 16, the switch mechanism 75 is operated as shown in FIG. 8 to de-energize the motor 88.

It should be noted that the curtain moves upward supported on the guide wires 57 and reeling wire 78 with the guide wires 57 being threaded through the grommets 76 to hold the roof curtain 71 securely to the wires. The wires 57 and 78 can be considered a curtain guide and support means. In this manner high winds will not blow the roof curtain from the roof, and the curtain will be supported above the roof surface on the wires.

The latch 42 for the lower compartment 28 is actuated by a wire 92 (FIGS. 4 and 5) that extends from the reel 87 over a pulley 93 to the latch 42. Thus, when the motor 88 is initially activated the wire 92 is pulled to operate the latch 42 and allow the door 40 to swing down to allow the side curtain to unfurl by gravity.

The end units 24 are somewhat similar to the lower compartments 28 of the elongated side enclosures 26. Each of the side units 24 includes a housing or rectangular enclosure 95 (FIG. 11) that extends along the end edges 15. The enclosure 95 is substantially rectangular in cross-section having a trap door 96 pivoted on a hinge 97. A release latch 98 normally holds the door 96 in the closed position. The latch 98 is operated by a wire 100 that extends over a pulley 101 to the reel 87. When the motor 88 is operated the wire 100 is pulled to release the latch 98 and drop the door 96 open. An end curtain 102 is mounted in the housing 95 in a folded or furled condition as shown in FIG. 11. The curtain 102 has a lower end with a curtain bar 103 affixed thereto to rapidly unfurl the curtain when the door 96 is opened. When the latch 98 is open the curtain is allowed to unfurl downward as shown in FIG. 2 to protect the end of the building structure. Depending upon the pitch of the roof 13, the length of the sides of the end curtain 102 will be varied to fully cover the end walls 12.

Alternatively, the roof curtain 71 may be mounted in a ridge housing 105 shown in FIG. 12. The ridge housing 105 includes side walls 106 and 107 that are pivoted about hinges 108 to allow the curtain ends to be pulled down the guide wires 57 and the reeling wires 78. The housing 105 has a curtain support 110 for supporting the roof curtains thereon. A motor 111 is mounted in the housing 105 with a reel 112 connected to the reeling wire 78. The reeling wire 78 is mounted in a similar manner to that shown in FIGS. 1 and 2, except the wires extend from the curtain downward over

a pulley structure (not shown) mounted along the side edges 14 of the roof and then back to the reel 112.

Included in the electrical circuit for operating the motors 88, includes a battery charger 116 that is connected to a battery 117. A manual on-off switch 118 is connected between the battery and the motor 88. The sensing means 90 has a switch contact 119 included in the circuit for energizing the motors when the sensing means is activated. The battery 117 provides power to the motor 88 even though electrical power to the building structure may be terminated. During its non-use, the battery 117 is maintained charged by the battery charger 116.

It should be understood that the above described embodiment is simply illustrative of the principles of this invention, and that numerous other embodiments may be readily devised without deviating therefrom. Therefore, only the following claims are intended to define this invention.

What is claimed is:

1. In combination with a building structure having a roof surface, a fire protection device for protecting the roof surface of the building structure from catching fire from sparks or flames generated by a fire adjacent the building, comprising:

- an elongated enclosure mounted to the building structure adjacent the roof surface;
- a fire resistant curtain of sufficient size to cover at least a major portion of the roof surface furled in the elongated enclosure for storage;
- a plurality of support wires extending over and spaced above the roof surface for supporting the curtain above the roof surface;

in which at least one of the wires is movably mounted about a pulley positioned at a remote roof location from the elongated enclosure with one end of the movable wire being connected to the curtain and the other end extending from the pulley to the elongated enclosure;

an operable wire reeling means connected to the

other end of the movable wire at the elongated housing for winding the movable wire when operated to unfurl the curtain from the elongated enclosure and pull the curtain over said major roof portion with the curtain being supported above the roof by the support wires and movable wire.

2. A fire protection device as defined in claim 1 wherein the curtain has a plurality of spaced grommeted holes therein for threadably receiving at least one of the wires as the curtain is spread over the roof to secure the curtain to the wire.

3. A fire protection device as set out in claim 1 further comprising a wire guide member extending upward from the enclosure for slidably receiving and supporting the movable wire above the roof surface.

4. A fire protection device as set out in claim 3 wherein the wire guide member includes a tube having a curved upper end that projects toward the remote location in which the curved upper end has a bore to slidably receive the other end of the movable wire and a top groove formed therein to slidably receive and support the one end of the movable wire.

5. A fire protection device as set out in claim 1 wherein the elongated enclosure has two elevationally spaced compartments with the roof curtain located in the upper compartment and a furled side curtain located in the lower compartment, said lower compartment having a bottom door that is openable to allow the side curtain to gravitationally unfurl along a side of the building structure.

6. A fire protection device as set forth in claim 1 wherein the elongated enclosure is affixed to the building along one edge of the roof and inset partially underneath the roof and wherein the elongated enclosure has a double hinged lid means normally overlying the furled curtain and enclosing the elongated enclosure for enabling the enclosure to be opened as the curtain is unfurled even though the enclosure is inset partially underneath the roof.

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