United States Patent

[11] 3,583,490

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[54] **FIRE PROTECTION SYSTEM**
10 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **169/2,**
169/13, 169/16
[51] **Int. Cl.** **A62c 3/00**
[50] **Field of Search** 169/2, 13,
16

[56] **References Cited**
UNITED STATES PATENTS

2,337,710	12/1943	Cowan	169/2X
3,179,181	4/1965	Banzato	169/13

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ABSTRACT: A fire protection system for wetting the exterior surface of a building structure to prevent ignition of the structure by a fire in the vicinity of the structure. The protection system embodies a unique recirculating water system for directing water over both the roof and side walls of the structure and an automatic fire detection and control system for activating the water system in response to a fire and terminating operation of the water system when the fire is extinguished.

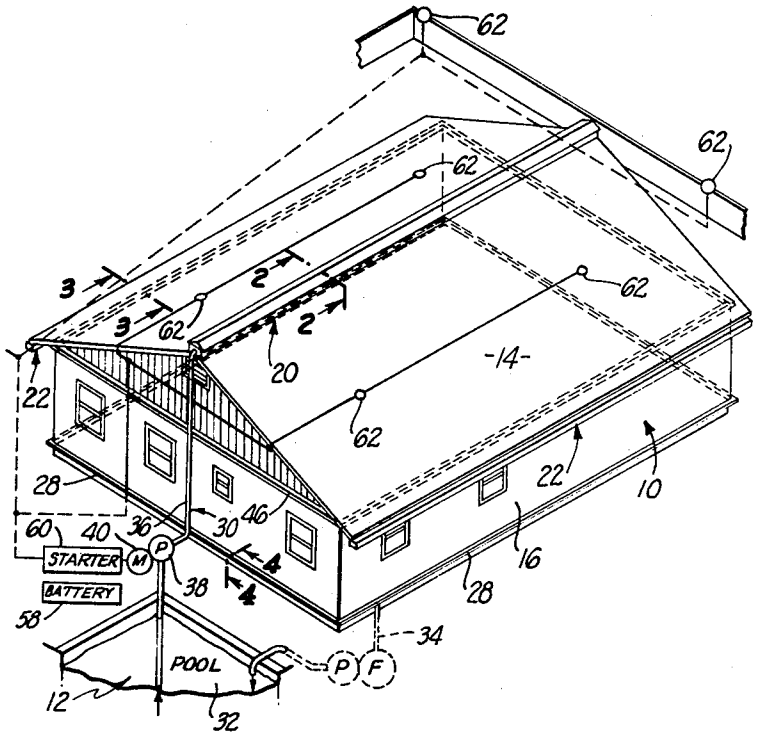


FIG. 2.

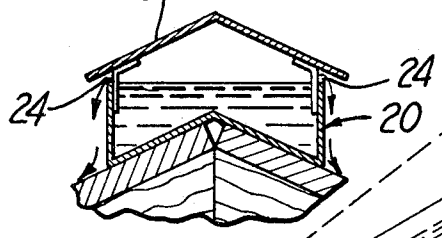


FIG. 1.

FIG. 3.

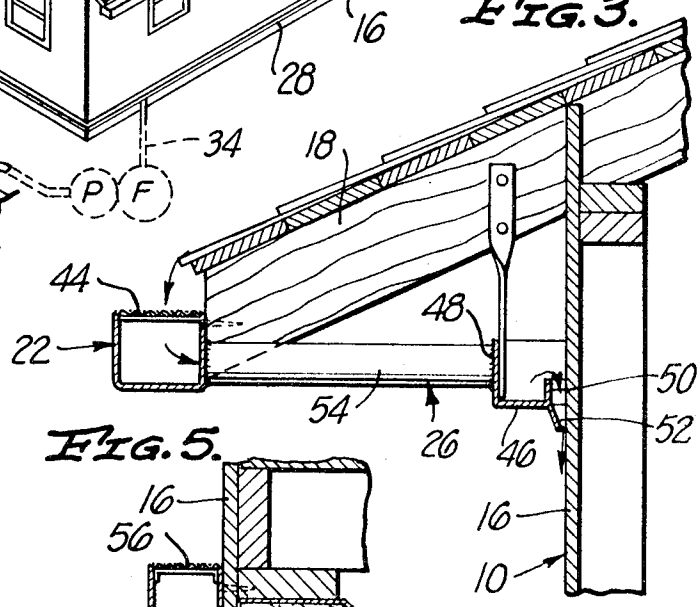


FIG. 4.

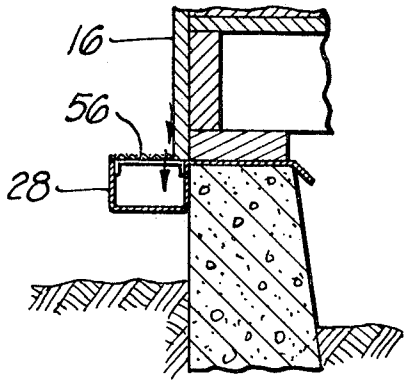


FIG. 5.

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FIRE PROTECTION SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to the field of fire protection systems and more particularly to a fire protection system for wetting the outside of a building structure in response to a fire in the vicinity of the structure, thereby to prevent ignition of the structure by the fire.

2. Prior Art

In certain areas, notably Southern California, hazardous fire areas exist in which homes and other building structures face the constant threat of being consumed by fires which start, not within the structures themselves, but rather in surrounding brush areas. By way of example, the large population growth in the Los Angeles area of Southern California has resulted in the extension of home construction into the surrounding mountain and canyon regions. These regions are generally quite dry and, being covered by brush and trees, are prone to frequent fires. In recent years, a number of these brush fires have caused large scale destruction of homes which are often large and costly.

Various fire protection systems have been devised to protect homes and other building structures against ignition by such surrounding brush fires and other fires which originate outside the structures. One of these existing fire protection systems is disclosed in U.S. Pat. No. 3,179,181. This patent system uses a home swimming pool as a water reservoir and provides a plumbing system for pumping water from the pool and discharging the water over the roof of the house to wet the roof and thereby prevent its ignition by falling sparks and embers from a fire in the vicinity. U.S. Pat. No. 1,620,142 discloses a plumbing arrangement for a fire protection system which is arrayed to direct water over both the roof and walls of a structure.

BRIEF SUMMARY OF THE INVENTION

The present invention provides an improved fire protection system of the general class described. According to one aspect of the invention, the water circulating system or plumbing of the fire protection system is uniquely arranged in such a way that water is discharged onto the roof of a structure along its peak or crest and flows by gravity along the roof to the eaves, then around the underside of the eaves to the walls, and finally downwardly along the walls. In this way, both the roof and walls are wetted with a relatively simple water circulating system which is economical to manufacture and easy to install. One element of this circulating system is a gutter which serves the dual function of a rain gutter. According to an important feature of this inventive aspect, a trough is provided along the base of the walls for collecting the water flowing downwardly, along the walls and directing the water to a reservoir, such as a swimming pool from which the water is returned to the roof.

Another important aspect of the invention is concerned with automatic control of the water circulating system in such a way that the system is started when a fire is detected and stopped when the fire is quenched. According to this aspect, the circulating system has a pump or other flow inducing or regulating device operated by a control unit coupled to one or more fire sensors. These sensors are placed at selected locations on and/or about the building structure to be protected. Detection of a fire by any sensor actuates the control unit to start the water circulating system.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a building structure equipped with a fire protection system according to the invention;

FIG. 2 is an enlarged section taken on line 2–2 of FIG. 1;

FIG. 3 is an enlarged section taken on line 3–3 in FIG. 1;

FIG. 4 is an enlarged section taken on line 4–4 in FIG. 1; and

FIG. 5 is a modification of the structure shown in FIG. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Turning now to these drawings, there is illustrated a building structure **10**, in this instance a house, equipped with a fire protection system **12** according to the invention. Structure **10** has a peaked or sloping roof **14** and sidewalls **16**. The edge of the roof projects beyond the sidewalls to form an overhanging eave **18**.

In general terms, the fire protection system **12** comprises a water conduit **20** mounted along the peak or crest of the roof **14** and a gutter **22** mounted along the edge of the roof. Conduit **20** has outlet means **24** for discharging water onto the roof **14** adjacent its crest, such that the water flows by gravity downwardly along the roof and into the gutter **22**. The gutter has outlet means **26** for discharging water under the eaves **18** onto the upper portions of the sidewalls **16**. The water thus flows by gravity downwardly along the walls. Mounted along the base of the walls is a trough **28** for collecting the water draining from the walls.

Also included in the fire protection system **12** is a water recirculating system **30** for returning water from the lower base trough **28** to the roof conduit **20**. This recirculating system includes a water reservoir **32**, which in this instance is a swimming pool, a drain conduit or pipe **34** leading from the lower trough **22** to the reservoir, a return conduit **36** leading from the reservoir to the roof conduit **20**, and a pump **38** operated by a motor **40** for pumping water from the reservoir to the roof conduit.

Referring in more detail to the inventive embodiment selected for illustration, the roof conduit **20** is an upwardly opening trough having sidewalls over which the water flows from the trough to the roof **14**. Mounted over the trough is a cover **42** for shielding the trough against falling ashes, leaves and other debris which might clog the system. Cover **42** is spaced from the trough sidewalls to define the outlet means **24** of the roof conduit.

The roof eave gutter **22** is an upwardly opening trough which is mounted along the edge of the roof to catch the water draining from the roof. This gutter is preferably covered by a screen **44** or the like to keep debris out of the gutter. It will be observed that the gutter also serves as a rain gutter.

The outlet means **26** of the gutter **22** comprises an upper trough **46** which is mounted under the eaves **18**, adjacent the upper portion of the building sidewalls **16**. As shown best in FIG. **5**, the trough has a high outer wall **48** such that water overflows only the inner wall **50** of the trough. Along the lower edge of the inner wall is a baffle **52** for directing the water against the adjacent building wall **16**. Extending between the gutter **22** and the upper trough **46** are a number (only one shown) of pipes **54** through which water flows from the gutter to the conduit.

The sidewall base trough **28** is mounted along the base of the structure sidewalls **16**. FIGS. **4** and **5** illustrate two alternative ways of installing this base trough. Preferably, the base trough is covered by a screen **56** like the gutter **22**.

It will now be understood that when the pump **38** is operating, water is pumped from the reservoir or pool **32** to the roof crest conduit or trough **20**. The water flows from this trough to the roof **14** of the structure **10** and then along the roof to the gutter **22**. The water drains from the gutter to the upper trough **46** and then overflows this trough to the structure walls **16**. After running down along the walls, the water drains into the base trough **28** from which it returns to the pool **32**. Thus, the fire protection system **12** is effective to wet both the roof and sidewalls of the building structure.

Also embodied in the protection system is an automatic control system **58**. This control system has a control unit or starter **60** for the pump motor **40** and fire sensors or detectors **62** for actuating the control unit. The fire sensors **62** may be responsive to the heat of a flame and are coupled to the motor starter **60** in such a way that detection of a fire by any sensor triggers the starter to start the pump motor **40**. Cooling of the

sensor as a result of quenching of the flame actuates the starter to stop the motor. Obviously, a variety of commercial control systems may be used for this purpose. The fire sensors **62** may be arrayed about and/or on the building structure **10** in any manner which will best serve the operation of the fire protection system.

While the invention has been described in what is presently conceived to be one of its most practical embodiments, it will be evident to those versed in the art w that various modifications of the invention are possible within the spirit and scope of the following claims.

The inventor claims:

1. A fire protection system for a building structure having sidewalls and a sloping roof with a crest and eaves, comprising:

a water conduit mounted along said roof crest having outlet means for discharging water onto said roof adjacent said crest, whereby the water flows by gravity downwardly along said roof to said roof eaves, and a gutter mounted along said eaves for receiving the water from said roof and outlet means extending from said gutter under said eaves for discharging the water onto the upper portions of said sidewalls, whereby the water flows by gravity downwardly along said sidewalls.

2. A fire protection system for a building structure having sidewalls and a sloping roof with a crest and eaves, comprising:

a water conduit mounted along said roof crest having outlet means for discharging water onto said roof adjacent said crest, whereby the water flows by gravity downwardly along said roof to said roof eaves,

a gutter mounted along said eaves for receiving the water from said roof and having outlet means for discharging the water onto the upper portions of said sidewalls, whereby the water flows by gravity downwardly along said sidewalls, and

said conduit comprising an upwardly opening crest trough having sidewalls with upper edges over which water is adapted to flow from the latter trough to said roof.

3. A fire protection system according to claim **2** including:

a cover mounted over said crest trough in vertically spaced relation to said trough edges.

4. A fire protection system for a building structure having sidewalls and a sloping roof with a crest and eaves, comprising

a water conduit mounted along said roof crest having outlet means for discharging water onto said roof adjacent said crest, whereby the water flows by gravity downwardly along said roof to said roof eaves,

a gutter mounted along said eaves for receiving the water from said roof and having outlet means for discharging the water onto the upper portions of said sidewalls, whereby the water flows by gravity downwardly along said sidewalls,

a lower trough extending along the base of said sidewalls for receiving the water flowing downwardly along said sidewalls, and

means for recirculating water from said lower trough to said crest conduit.

5. A fire protection system according to claim **4** wherein:

said recirculating means comprises a water reservoir, means for delivering water from said reservoir to said crest conduit, and means for returning water from said lower trough to said reservoir.

6. A fire protection system for a building structure having sidewalls and a sloping roof with a crest and eaves, comprising:

a water conduit mounted along said roof crest having outlet means for discharging water onto said roof adjacent said crest, whereby the water flows by gravity downwardly along said roof to said roof eaves,

a gutter mounted along said eaves for receiving the water from said roof and having outlet means for discharging the water onto the upper portions of said sidewalls, whereby the water flows by gravity downwardly along said sidewalls,

said eaves project outwardly beyond said sidewalls, and

said gutter outlet means comprises a conduit mounted under said eaves adjacent the upper portion of said sidewalls and having outlet means for discharging water onto the upper sidewall portions, and means communicating said latter conduit to said gutter.

7. A fire protection system according to claim **6** including:

a lower trough extending along the base of said sidewalls for receiving the water flowing downwardly along said sidewalls, and

means for recirculating water from said lower trough to said crest conduit.

8. A fire protection system according to claim **7** wherein:

said recirculating means comprises a water reservoir, means for delivering water from said reservoir to said crest conduit, and means for returning water from said lower trough to said reservoir.

9. A fire protection system according to claim **8** wherein:

recirculating means comprises a recirculating pump, and

said fire protection system further comprises a fire sensor, and means controlled by said detector for starting said pump in response to detection of a fire by said sensor.

10. A fire protection system for a building structure comprising:

a water system for delivering water to the outer surfaces of said building structure,

at least one fire sensor located externally of said structure,

means controlled by said sensor for activating said water system to wet said structure in response to detection of a fire by said sensor, and

said water system comprising a water conduit mounted along said roof crest having outlet means for discharging water onto said roof adjacent said crest, whereby the water flows by gravity downwardly along said roof to said roof eaves, a gutter mounted along said eaves for receiving the water from said roof and having outlet means for discharging the water onto the upper portions of said sidewalls, whereby the water flows by gravity downwardly along said sidewalls, a water reservoir, means for delivering water from said reservoir to said crest conduit, and means for returning water from the lower portions of said building sidewalls to said reservoir.