

PATENT SPECIFICATION (11)

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(54) IMPROVEMENTS IN FIRE DETECTION AND EXTINGUISHING SYSTEMS

(71) I, JOSEPH ATTACK, of 170 Birkby Hall Road, Huddersfield, County of York; a British subject, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to improvements in fire detecting and extinguishing apparatus of the type in which a weight is connected to a thermo plastics line cable or filament, one end of which is affixed to a stationary point and adapted to fail structurally on heating to a predetermined temperature to release the weight.

A fire extinguishing system has been proposed in which a second weight is suspended from arms on a bracket, the arms being arranged to be separated to release the second weight by a snatch cord or chain activated by the release of the first weight on the rupture of the line cable or filament.

The object of the present invention is to provide a fire detection and extinguishing system for high ceiling buildings with large open spaces, incorporating to fail safe techniques.

In carrying out the invention a fire detection extinguishing apparatus comprises a plurality of weights each suspended from a thermo plastics line, cable or filament which when severed allow a weight to fall onto a pivoted platform, a push rod mounted on the platform, movement of the rod releasing a pin from an arm on the lever to pivot a second platform supporting a second weight to actuate a pressure gas cylinder to pressurize a second cylinder for the release of a powder or mist to blanket a fire.

According to the invention a fire detection and extinguishing apparatus of the type referred to comprises a plurality of weights, each suspended from a thermo plastics line, cable or filament which when severed releases a weight to fall onto a pivoted platform, a

push rod mounted on the platform, movement of the rod releasing a pin from an arm depending from a lever to allow pivoting of a second platform attached to the pin, to release a further weight supported by the second platform, the falling of the further weight opening a valve on a pressure gas cylinder to pressurize a second cylinder for the release of a powder or mist to blanket a fire.

The invention will be described with reference to the accompanying drawings:—

Figure 1 is a side elevation showing the apparatus in the inoperative position.

Figure 2; is a similar view showing the apparatus of Figure 1 in the operative position.

Figure 3; is a plan of the apparatus of Figure 1.

A plurality of lines, cables or filaments of nylon or other thermo plastics material are suspended adjacent a wall or ceiling of a building, one end of each line cable or filament being affixed to the wall or ceiling and the other end passing over a guide (not shown) and having a weight 1 attached thereto.

The weights 1 each hang in a chute or tube 2 above an inclined platform 3 pivoted on a bracket 5. A push rod 6 is pivoted on the platform 3 and when a weight 1 falls onto the platform 3 the rod 6 is raised to rock a lever 7, pivoted intermediate its ends. An arm 7a formed with a notch 7b is mounted to depend from the lever 7 the notch 7b housing a pin 9 mounted to extend horizontally from a second platform 10 pivoted on bracket 10a mounted on a casing 14 for the apparatus. A further weight 12 is carried on the platform 10 connected by a chain 12a to one end of a lever 11 pivoted intermediate its ends on a bracket 11a affixed to the head 15 of a cylinder of CO₂ or nitrogen or other inert gas under pressure. To operate the extinguishing apparatus the lever 7 is rocked by the rod 6 when a weight

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1 falls onto the platform 3 causing the platform to pivot and raise the rod 6. The rocking of the lever 7 removes the arm 7a from the pin 9 which allows the platform 10 to pivot and the weight 12 to fall, the chain 12a tightens and the lever 11 pivots to bring the free end into contact with a rod 11b slidable in the cylinder head 15 to open a valve in the cylinder and allow gas to pass into and pressurize a second cylinder 17 containing an inert non-toxic fire extinguishment powder or gas. The weight 12 and lever 11 hold the valve in the head 15 open and until the weight 12 is lifted.

After being operated the severed line, cord or filament is replaced and the weight 2 is suspended therefrom; the lever 7 is restored to its initial position and the platform 3 and rod 6 are reset.

The lever 7 is mounted substantially horizontally and may be stabilised by a spring detent (not shown) connected between the free end of the lever 7 and the frame 14.

The lever 7 may be manually operated by actuating a lever 21 mounted to rock the lever or it may be rocked by the piston 22 of a solenoid 23. The solenoid is energised by a battery and operated by a switch actuated by a smoke or heat or gas sensitive electronic detector system, the detectors may be connected by a multi core cable, one strand actuating a smoke detector and further strands operating a heat detector and a gas type sensitive electronic detector. The apparatus may also actuate a sprinkler system and operate relays to release fire exit doors or stop machinery or forced draught fans.

The non-toxic gas or powder on pressurization escapes through a delivery valve (not shown) from the cylinder 17 and passes along pipes or tubes 19. The pipes or tubes 19 are branched and supported in the area to be protected. The support for the branches is preferably away from the delivery end of the pipes or tubes which may be of a plastics material in order that when the contents of the second cylinder 17 pass therethrough under pressure the free ends of the pipes or tubes will wave about and thus distribute the cloud or mist over a larger area, or the ends of the pipes or tubes may be oscillated by mechanical or other means.

In order to prevent the pivoting of the platform 3 during installation or repair of the apparatus a pin 24 is provided to lock the platform to prevent it from falling if any one of the weights 1 is released.

The following is an example of a powder for providing the mist or gas cloud:—

Magnesium stearate, $\text{Mg}(\text{C}_{17}\text{H}_{35}\text{COO})_2 = 0.83\%$

Magnesium carbonate, as $\text{MgCO}_3 = 0.56\%$
Sodium bicarbonate, to make up to 100%.

The total magnesium content is determined using an E.D.T.A. titration, and by sub-

tracting the contribution from the stearate to give residual magnesium, which was calculated as magnesium carbonate, MgCO_3 .

The powder in solution has a pH of 8.5, which excludes the possibility of much soluble carbonate being present. Magnesium stearate was determined by boiling a portion with dilute acid to dissolve the carbonate and bicarbonate. The insoluble matter was separated, dried and weighed. Infra-red examination indicated that this substance was stearic acid, as expected; this residue was calculated as magnesium stearate.

The powder is white and free flowing and when released forms an inert non-toxic mist which envelopes any fire and insulates unburnt material.

The system may be employed in addition to a water sprinkler system as the mist blanket insulates the sprinkler system from heat and water is therefore not released and the sprinkler does not come into operation unless the heat from the fire is intense.

WHAT I CLAIM IS:—

1. A fire detection and extinguishing apparatus of the type referred to comprising a plurality of weights, each suspended from a thermo plastics line, cable or filament which when severed releases a weight to fall onto a pivoted platform, a push rod mounted on the platform, movement of the rod releasing a pin from an arm depending from a lever to allow pivoting of a second platform attached to the pin, to release a further weight supported by the second platform, the falling of the further weight opening a valve on a pressure gas cylinder to pressurize a second cylinder for the release of a powder or mist to blanket a fire.

2. A fire detection and extinguishing apparatus as in Claim 1 in which the powder or mist is released from the second cylinder through one or more tubes or pipes to provide a blanketing cloud or mist to isolate and smother a fire.

3. A fire detecting and extinguishing apparatus as in Claim 1 or 2 in which the pin on the second platform engages a notch in the arm, the unlocking of the lever allowing the second weight to fall.

4. A fire detecting and extinguishing apparatus as in Claims 1 to 3 in which a spring detent is connected between the free end of the lever and a stationary frame.

5. A fire detecting and extinguishing apparatus as in Claims 1 to 4 in which means are provided for operating the extinguishing system manually.

6. A fire detecting and extinguishing apparatus as in Claims 1 to 5 in which means are provided for locking the platform during installation or repair.

7. A fire detecting and extinguishing apparatus as in Claims 1 to 6 in combination with a smoke detector or a heat detector or a

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7. A fire detecting and extinguishing apparatus as in Claims 1 to 6 in combination with a smoke detector or a heat detector or a





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gas sensitive electronic detector to give an additional audible or visual warning or extinguishing protection.

reference to the accompanying drawings.

J. OWDEN O'BRIEN & SON,

Chartered Patent Agents,

53 King Street,

Manchester M2 4LQ.

8. A fire detecting and extinguishing
5 apparatus substantially as described with

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