

"Fire Screens or Curtains"

This invention relates to devices for restricting the spread of fire in large enclosed public areas and open-plan buildings and is concerned with devices in the form of retractable screens or curtains, hereinafter referred to as
5 "screens", which are installed in elevated positions in the spaces to be protected and can be lowered to partition the spaces in the event of fire.

It is a principal object of the invention to provide a device of the kind described which can be employed in a
10 conventional fire protection system and automatically operated in response to the presence of smoke or flames and to this end, according to the invention, the device comprises a screen of flexible fire-proof material wound upon and adapted to unwind under gravity from, a rotatable
15 roller, an electromagnetic unit normally connected to an electric current source and operative, when energised, to retain the screen in its wound or retracted position, and means, operable in response to the presence of fire, to interrupt the supply of power to said unit and permit the
20 screen to unwind into its operative or extended position.

Said means operable in response to the presence of fire is perferably also operable in response to activation of a fire protection system.

The screen may be split or apertured between its
5 ends to enable persons to pass through it in its extended condition, in which case a second screen is provided which is effective, when extended, to cover the gap in the first screen, said second screen being secured at its upper end to said roller or to a second roller extending in spaced
10 parallel relation to the first roller and at its lower end to a weighted bar at the lower end of the first screen so that it is movable up and down with the first screen and makes it necessary for persons to pass between it and the first screen before passing through the gap in the latter.

15 The invention will be further described, by way of example, with reference to the accompanying drawings in which:

Figure 1 is a perspective view, with parts cut away, of one form of fire screen in accordance with the invention;

20 Figures 2, 3 and 4 are diagrammatic views illustrating the manner of operation of the fire screen shown in Fig. 1; and

Figure 5 is a view, similar to Fig. 1, of another form of fire screen in accordance with the invention.

As shown in Figs. 1 to 4, a smoke-proof and flame-proof screen 1 made of woven glass fibre cloth to which is applied a layer of aluminium, is guided at its edges in fixed side channels 2 and is wound upon a hollow roller 3, of extruded aluminium or other suitable metal, rotatably mounted in an elevated position above a false ceiling 4 or in a box (not shown) secured below a permanent ceiling. The roller 3 is rotatable in a direction to wind up the screen 1 by an electric motor 5 mounted within the roller and operative thereon through a gear unit 6 and a drive spindle 7 and is prevented from rotating in the opposite direction under the influence of a weighted bar 8 secured to the bottom of the screen, by energisation of an electromagnetic brake unit 9 which acts on the end of the drive spindle remote from the motor. The brake unit 9 is normally connected to a source of electric current to retain the screen 1 in its wound-up or retracted position but is also connected through leads 10 into a conventional fire-protection system employing one or more sensing devices 11 so that when the system is activated it automatically interrupts the supply of power to the brake which becomes de-energised and permits the roller 3 to

rotate in the unwinding direction under the influence of the weighted bottom bar 8 of the screen until the screen is fully lowered. Restoration of the power supply to the brake unit 9 permits the motor 5 to be operated to rotate the roller 3 in a direction to raise the screen 1 which is then retained in its raised position by the continued supply of power to the brake unit.

In normal conditions the screen is in its retracted position shown in Fig. 2. As smoke and flames approach the sensing device 11, as shown in Fig. 3, the latter is activated, removing power from the brake unit and permitting the screen to drop and form a barrier against the smoke and flames, as shown in Fig. 4.

In the embodiment shown in Fig. 5, in which like parts are indicated by the same reference numerals as in Fig. 1, a screen 12 made of the same material and supported in the same manner as the screen 1, is formed with a narrow central gap 13 through which a person can pass when the screen is fully extended. The gap 13 is closed on one side of the screen 12 by an additional fire-proof screen 14 made of the same material as the screen 12 and wide enough to overlap the screen 12 on both sides of the gap 13. The upper end of the screen 14 is secured to a

roller 15 rotatably mounted adjacent the roller 3 and the lower end of the screen 14 is secured to the weighted bottom bar 8 of the screen 12 so that up and down movement of the screen 12 will result in corresponding movement of 5 the screen 14 while permitting a person to pass between the screens to or from the gap 13 when the screens are fully extended.

In a modified form of the invention (not shown in the drawings) the electric motor may be replaced by a 10 manually operable winding mechanism for raising the screen, the brake unit operating in the manner described with reference to the previous embodiments.

In another embodiment of the invention (not shown), the roller is mounted for rotation by hand in a casing 15 which is closed by a hinged flap to prevent the screen from unwinding under the influence of its weighted bottom bar. The flap is retained in its closed position by energisation of an electromagnetic catch which, like the brake units of the previous embodiments, is normally connected to a source 20 of electric current but is automatically disconnected upon activation of the fire-protection system to release the flap and permit the screen to unwind under gravity.

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CLAIMS:

1. A device for installation in an elevated position in an enclosed space and operable automatically in the event of fire to partition said space and restrict the spread of the fire therein, said device comprising
5 a screen of flexible fire-proof material wound upon and adapted to unwind under gravity from, a rotatable roller, an electromagnetic unit normally connected to an electric current source and operative, when energised, to retain the screen in its wound or retracted position,
10 and means, operable in response to the presence of fire, to interrupt the supply of power to said unit and permit the screen to unwind into its operative or extended position.
2. A device according to Claim 1, wherein said
15 means is operable in response to actuation of a fire protection system.
3. A device according to Claim 1 or 2, wherein the screen is made of woven glass fibre cloth to which is applied a layer of aluminium.

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4. A device according to any preceding claim, wherein the vertical edges of the screen are guided in fixed side channels.

5. A device according to any preceding claim,
5 wherein said roller is made of extruded aluminium.

6. A device according to any preceding claim, wherein said roller is mounted above a false ceiling provided with an aperture for the passage of the screen.

7. A device according to any preceding claim,
10 wherein said electromagnetic unit is in the form of a brake which acts, when energised, to prevent rotation of said roller in the unwinding direction.

8. A device according to Claim 7, wherein said roller is mounted on a drive spindle which is rotatable
15 in one direction by an electric motor and gear unit mounted in said roller, to wind said screen and is prevented from rotating in the opposite direction by said brake when energised.

9. A device according to Claim 7 or 8, wherein the
20 lower end of said screen is secured to a weighted bar which is capable of lowering said screen when the supply of power to the brake is interrupted.

10. A device according to Claim 7, provided with a manually operable winding mechanism for raising said

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screen.

11. A device according to any one of Claims 1 to 6, wherein said roller is rotatably mounted in a casing closed at its lower end by a hinged flap and said electromagnetic unit is a catch which, when energised, retains said flap in its closed position and when de-energised permits said flap to open and release said screen which unwinds under gravity.

12. A device according to any preceding claim, wherein said screen is split or apertured between its ends to permit a person to pass therethrough and a second fire-proof screen movable with the first screen is effective to mask the split or aperture in the first screen and prevent the passage of fire therethrough when both screens are fully extended.

13. A device according to Claim 12, wherein said second screen is mounted at its upper end on a second roller extending in spaced parallel relation to the first roller and is secured at its lower end to the lower end of the first screen in such a manner as to permit a person to pass between said screens to and from said aperture.

14. A fire protection system comprising a plurality

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of devices according to any preceding claim installed in elevated positions at intervals across a space to be protected.

15. A fire protection system according to Claim 14, and including a plurality of fixed devices sensitive to heat and/or smoke.

16. A device for restricting the spread of fire, substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

17. A fire protection system substantially as hereinbefore described with reference to the accompanying drawings.
