Aug. 21, 1956 C. L. ZABRISKIE 2,759,546

COMBINED LIGHTING FIXTURE AND FIRE EXTINGUISHER ASSEMBLY

Filed Aug. 19, 1954

Fig. 1.

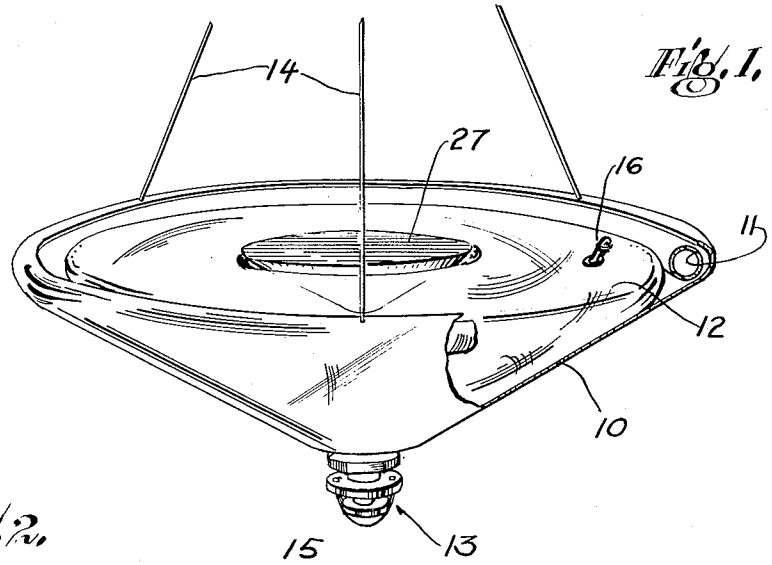


Fig. 2.

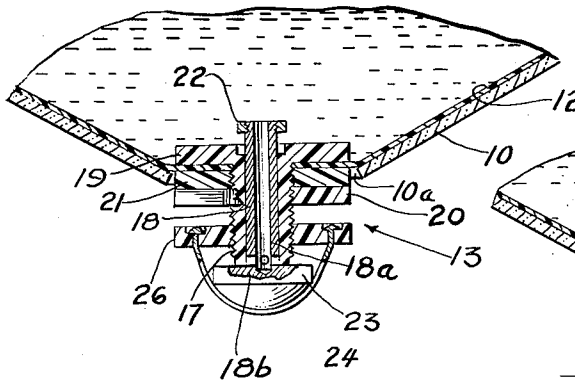
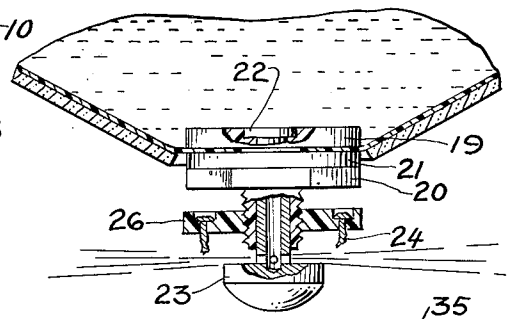


Fig. 3.



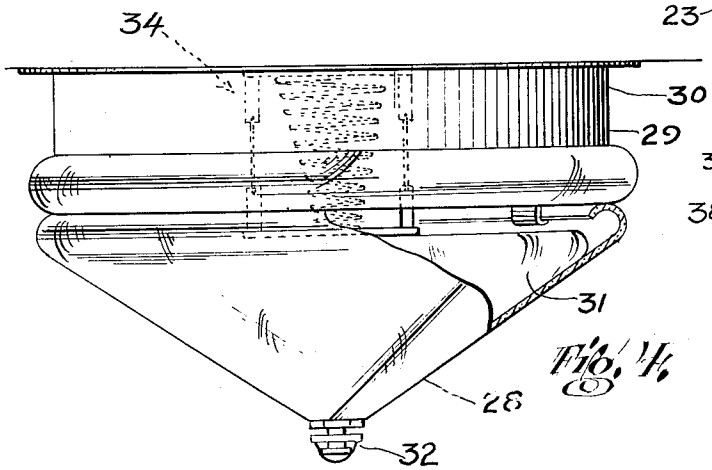


Fig. 4.

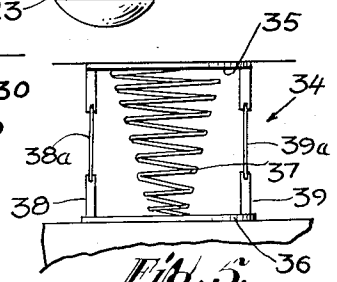


Fig. 5.

INVENTOR
CHARLES L. ZABRISKIE
BY
Kenyon & Kenyon
ATTORNEYS

United States Patent Office 2,759,546 Patented Aug. 21, 1956

2,759,546

COMBINED LIGHTING FIXTURE AND FIRE EXTINGUISHER ASSEMBLY

Charles L. Zabriskie, New York, N. Y., assignor to Essex Products, Inc., New York, N. Y., a corporation of New Jersey

Application August 19, 1954, Serial No. 450,848

12 Claims. (Cl. 169—26)

The present invention relates to illumination devices in conjunction with fire extinguishers and more particularly to a combined fire extinguisher and electrical lighting assembly adapted to be mounted on the ceiling of a room and having the outward apeparance of a reflector-type light fixture.

Fire extinguishers are known in which an extinguishing fluid is contained in a compressible bag, the extinguisher being actuated by manually squeezing the bag to produce a liquid stream. Such fire extinguishers, while popularly used in warehouses and factories, have generally not been accepted for installation in homes or offices. The appearance of the ordinary fire extinguisher is not such as to render it presentable in the living room of a home or in a well-appointed office. Moreover, such extinguishers are non-automatic and, in the absence of a human operator, offer no protection against fire hazards.

Accordingly, it is the principal object of the invention to provide a novel light fixture and fire extinguisher assembly for mounting or suspension from a ceiling, which assembly will impress an observer as constituting an attractive reflector-type light fixture.

More particularly, it is an object of the invention to provide an assembly of the above-described type wherein the light reflector also functions as a housing for the flexible transparent container of a fire extinguisher, and wherein the disposition of the extinguisher within the light reflector in no way interferes with the production and reflection of light.

Another object of the invention is to provide a combined light fixture and fire extinguisher assembly whereby the device normally functions as a conventional light source; but when the ambient temperature of the room exceeds a predetermined safety level, an extinguishing liquid is automatically ejected from the assembly.

Still another object of the invention is to provide an assembly of the above-described type wherein the components constituting the assembly may be readily dismantled and cleaned and wherein the container for the extinguishing fluid may be quickly refilled, without the use of special tools.

It is also an object of the invention to provide an improved nozzle-valve for a fire extinguisher and a thermally-responsive actuator therefor.

Yet another object of the invention is to provide an assembly of the character described which is of simple and sturdy design, and which is inexpensive to manufacture and install.

Briefly stated, a preferred form of the invention comprises a conical light reflector having an apex opening, the reflector being mounted or suspended from its base on the ceiling of a room. A similarly shaped container is housed within the reflector and is provided with a nozzle valve projecting downwardly through the opening therein. Also provided is a thermally-responsive actuating device coupled to the valve to maintain same normally closed and to release the nozzle when the ambient temperature rises above a given safety level whereby a stream of extinguishing fluid is ejected from the device.

For a better understanding of the invention as well as other objects and further features thereof, reference is made to the following detailed description to be read in connection with the accompanying drawing wherein like elements in the several views are represented by like reference numerals.

In the drawing:

Fig. 1 is a perspective view of one preferred embodiment of a combined electric lighting device and fire extinguisher in accordance with the invention.

Fig. 2 is a longitudinal sectional view of the nozzle-valve of the extinguisher in the non-operative or closed position.

Fig. 3 is a sectional view of the nozzle-valve in the open or operating position.

Fig. 4 is a perspective view of a second preferred embodiment of the invention.

Fig. 5 is a detail view, in elevation, of the pressure means in Fig. 4.

Referring now to the drawings and more particularly to Figs. 1 to 3, the combined lighting fixture and fire extinguisher assembly comprises a generally conical reflector **10**, an annular light bulb **11** coaxially mounted therein, and a conically-shaped flexible container **12** housed within the reflector and provided with a nozzle-valve **13** projecting downwardly through an opening **10***a* formed in the apex of the conical reflector.

Reflector **10** has an inwardly-extending flange **10***b* formed at the base thereof and is suspended from the ceiling of the room by means of suitable wires or cables **14** attached to the reflector at equi-spaced points on flange **10***b*. The connection of the cables **14** to the reflector may be made by suitable hooks to facilitate the removal of the assembly for replacement of the bulb, for cleaning of the parts or other purposes. Light bulb **11** is preferably constituted by a circular fluorescent tube received within a suitable socket secured to the reflector below flange **10***b*, whereby light is uniformly emitted within the reflector. The reflector **10** may be fabricated of a shallow, metal cone whose inner surface is polished to reflect the light from the bulb and to direct it upwardly toward the ceiling. If desired, a translucent glass or plastic material may be used for the reflector.

The conically-shaped container **12** is made of a flexible, transparent material, impervious to the fire-extinguishing agent contained therein, the shape of the container conforming to that of the reflector. A suitable fire-extinguishing liquid is carbon tetrachloride **15**, and the container **12** may be filled therewith through a flexible inlet pipe **16** projecting upwardly from the base wall of the container and integral with said wall. The inlet pipe **16** may be sealed by the use of a clip, a rubber band or other means. The walls of the container are preferably fabricated of colorless, transparent synthetic material consisting of polyvinal alcohol or other polyvinyl compounds which yield substances of soft flexible characteristics which are readily bonded and are not chemically attached by the usual extinguishing agents. A laminated construction may also be used including an outer protective layer.

The nozzle-valve **13** which projects from the apex or mouth portion **12***a* of container **12** through opening **10***a* in the reflector is constituted by a hollow cylinder **17** and a piston **18** slideable therein. Cylinder **17** is externally threaded and is provided at the upper end with a disc-shaped flange **19**. Flange **19** abuts the inner surface of the mouth portion **12***a*, the body of the cylinder projecting downwardly through an orifice in the mouth portion. To secure the cylinder **17** to the mouth portion **12***a* of the container, a nut **20** is threadably received on the cylinder and is tightened to press a washer **21** against the outer surface of mouth portion **12***a*, thereby clamping

the mouth portion between flange 19 and washer 21 and providing a liquid-tight seal. The various elements forming the nozzle-valve are preferably fabricated of a rigid plastic substance impervious to the extinguishing agent.

Piston 18 is greater in length than cylinder 17 and includes a longitudinal bore 18*a* forming an outlet passage for the fluid in the container 12. Threadably attached to the upper end of piston 18 is a stop collar 22 and integral with the lower end of the piston is a dome-shaped cap 23 terminating outlet passage 18*a*. Thus, the movement of piston 19 is limited in the downward direction by collar 22 and in the upward direction by cap 23. It will be noted that collar 22 is receivable in a recess formed in flange 19.

A plurality of circumferentially-arranged nozzle openings 18*b* are formed in piston 18 and extend radially into passage 18*a*. An actuator device for the nozzle valve is constituted by a fuse strip 24 looped across the dome of cap 23. The ends of strip 24 are secured in diametrically-opposed slots 25 formed in a disc 26, threadably received on cylinder 17. The length of fuse 24 and the position of disc 26 on the cylinder 17 is such as to maintain cap 23 against the lower end of the cylinder, whereby the radial nozzle openings 18*b* on the piston are blocked. Thus, the valve nozzle is normally closed, and the piston 18 occupies the position shown in Fig. 2. Resting on the base of container 12 is a weighted element 27 formed of a heavy metal such as lead. Weighted element 27 is of truncated conical shape, the slope of the side wall of the element conforming to the slope of the reflector. Element 27 bears down on flexible container 12 and applies a compressive force thereto. However, the fuse strip 24 is sufficiently strong to prevent release of the nozzle valve in response to the force applied by element 27.

The thermal characteristics of fuse strip 24 are such that when the ambient temperature of the room rises above a predetermined level, as a result of fire, the fuse will melt—thereby freeing cap 23. The pressure exerted by weighted element 27 on the liquid 15 within container 12 is transmitted through passage 18*a* to cap 23, to force the piston 18 on the downward direction. Thus, the nozzle valve is caused to occupy the position shown in Fig. 3, where it will be seen that the nozzle openings 18*b* are exposed. The exposure of the nozzle openings and the hydraulic pressure brought to bear on the container by the element 27 results in a stream of liquid which is ejected radially from the nozzle valve in all directions to provide a uniform spray in the room to arrest the fire therein. In order to direct liquid below the reflector as well as outwardly, suitable deflection elements (not shown) may be attached to disc 26 to divert some of the stream in the desired direction.

It is important to note that both the container 12 and the carbon tetrachloride are colorless and transparent; hence their presence within the reflector in no way interferes with the reflection of light therein. It is also to be understood that an incandescent light may be used suspended centrally above the reflector, rather than on the fluorescent light tube, as shown.

It is to be understood that while there has been shown an actuator constituted by a fuse strip, other forms of actuators may be used to release the nozzle-valve when the ambient temperature rises unduly. Thus, a bimetallic element may be employed adapted to release the valve in response to a temperature rise above a predetermined safety level.

Rather than suspend the assembly from the ceiling by means of cables, as shown in Fig. 1, it may be preferred to mount the assembly directly on the ceiling. Thus, in the embodiment shown in Fig. 4, the conical reflector 28 is mounted on the ceiling by means of a drum 29 whose upper end is provided with a flange 30 for fixedly attaching the drum to the ceiling. The reflector 28 is detachably coupled to the other end of the drum 29 by suitable means, such as a bayonet joint or a threaded connection, enabling the ready removal of the reflector.

Positioned within the reflector 28 is an extinguishing-fluid container 31 corresponding to container 12 in Fig. 1, and projecting from the mouth of the container downwardly through an apex opening in reflector 28 is a fuse-actuated nozzle-valve 32 corresponding to nozzle valve 13 in Fig. 1. Surrounding drum 29 at the junction of the drum and the reflector is a fluorescent tube 33 detachably mounted in a suitable socket.

To effect a rapid ejection of the extinguishing agent upon release of the valve, a pressure member 34 is provided within the drum 29. Member 34 includes base plate 35, a depressor plate 36 and a helical expansion spring 37 connected therebetween. Member 34 is interposed between the ceiling and the top wall of the container 31, the spring 37 being normally maintained in a compressed state by means of a pair of links 38 and 39 connecting plates 35 and 36 and including intermediate fuse-sections 38*a* and 39*a*. Fuse-sections 38*a* and 39*a* are adapted, in response to a given ambient temperature value, to release the links, whereby the resultant expansion of spring 37 applies a downward pressure via depressor plate 36 onto the container 31, tending to force the liquid out of the nozzle-valve. The thermal characteristics of fuse-sections 38*a* and 39*a* may be made to correspond to that of the fuse actuator on nozzle-valve 32, whereby the release of the valve is accompanied by a strong liquid ejaculation. Alternatively, the thermal characteristics of fuse-sections 38*a* and 39*a* may be such as to release the links only when the temperature rises a given small amount above that necessary to melt the fuse on the nozzle-valve, thus preventing inadvertent operation of the extinguisher.

It is to be understood that the pressure member may be formed without links 38 and 39, so that the pressure on the container is exerted at all times. Of course, the liquid extinguisher is not ejected until the fuse is melted. Also to be noted is that the lighting element may be omitted from the assembly, whereby the structure suspended or attached on the ceiling is purely a fire extinguisher in a conical housing, though it presents the appearance of a lighting fixture.

As a further modification of the invention, the nozzle 32 (Fig. 4) or 13 (Fig. 1) may be replaced by a simple outlet plug secured to the mouth of the container and provided with a passage communicating with the container interior and radial nozzle bores for producing a uniform spray. The container in conjunction with the plug is provided with a neck extension which is normally clamped between opposing arms of a U-shaped spring, said arms being bound together by means of a circular fuse strip. The natural spring tension is such that when the fuse melts, the arms of the spring pull apart to release the neck of the container and permit the flow of liquid therethrough into the outlet plug.

While there has been shown what are at present preferred embodiments of the invention, it is to be understood that many changes and modifications may be made therein without departing from the true spirit of the invention. It is intended, therefore, in the appended claims to cover all such modifications and changes as fall within the proper scope of the invention.

I claim:

1. A combined light fixture and fire extinguisher assembly comprising a ceiling light reflector having a bottom opening therein, a flexible container for a fire extinguishing liquid housed within said reflector, said container being provided with a pressure-responsive nozzle-valve projecting downwardly through said opening, means operative on said container to impart a compressive force thereto, and thermally-responsive actuating means coupled to said valve to maintain same normally closed and to release said valve when the ambient temperature exceeds a pre-

determined level, said valve being opened by the compressive force exerted by the liquid in the container.

2. A combined ceiling light fixture and fire extinguisher assembly comprising a conical light reflector having an opening in the apex thereof, an annular lighting element coaxially mounted within said reflector adjacent the base thereof, a transparent flexible conical container for a fire-extinguishing liquid housed within said reflector and provided with a pressure-responsive nozzle-valve projecting from the apex thereof downwardly through said opening in said reflector, means operative on said container to impart a compressive force thereto, and thermally-responsive actuating means coupled to said valve to maintain same normally closed and to release said valve when the ambient temperature exceeds a predetermined level, said valve when released being opened by the compressive force exerted by the liquid in the container.

3. A combined ceiling light fixture and fire extinguisher assembly comprising a conical light reflector having an opening in the apex thereof, an annular lighting element coaxially mounted within said reflector adjacent the base thereof, a transparent flexible conical container for a fire-extinguishing liquid housed within said reflector and provided with a pressure-responsive nozzle-valve projecting from the apex thereof downwardly through said opening in said reflector, thermally-responsive actuating means coupled to said valve to maintain same normally closed and to release said valve when the ambient temperature exceeds a predetermined level, and a conical weighted element resting on the base of said conical container for depressing said container to open said valve and to eject said liquid upon release of said valve.

4. A combined ceiling light fixture and fire extinguisher assembly comprising a conical light reflector having an inwardly-directed base flange and an apex opening, an annular fluorescent bulb coaxially mounted within said reflector adjacent the base thereof, cable means connected to the flange of said reflector to suspend same from a ceiling, a transparent flexible conical container for a fire-extinguishing liquid housed within said reflector and provided with a pressure-responsive nozzle-valve projecting from the apex thereof downwardly through said opening in said reflector, and a fuse member coupled to said nozzle-valve normally to maintain same inoperative and to release said nozzle when the ambient temperature rises above a predetermined value, said valve being opened by the pressure applied by said weight and transmitted by said liquid.

5. A combined ceiling light fixture and fire-extinguisher assembly comprising a conical light reflector having an opening in the apex thereof, a transparent flexible conical container for a fire-extinguishing liquid housed within said reflector and provided with a pressure-responsive nozzle-valve projecting through the apex thereof downwardly through said opening in said reflector, said valve including a hollow cylinder, a piston slideable within said cylinder and having a longitudinal passage opening into said container and a plurality of lateral nozzle bores extending into said passage, means operative on said container to apply a compressive force thereto which is transmitted by the liquid to said piston, and thermally-responsive actuating means coupled to said nozzle-valve to secure said piston against movement at a position at which said nozzle bores are blocked within said cylinder and to release said piston when the ambient temperature exceeds a predetermined level.

6. In a fire extinguisher, a flexible container for an extinguishing liquid and having a conical shape, a pressure-responsive nozzle-valve projecting from the apex of said container and comprising a hollow cylinder, a piston slideable within said cylinder and having a longitudinal passage opening into said container and a plurality of lateral nozzle bores extending into said passage, and an actuator element adapted to secure said piston against movement at a position at which said nozzle bores are

blocked within said cylinder, means operative on said container to apply a compressive force thereto which is transmitted by said liquid to said piston, said actuator releasing said piston when the ambient temperature exceeds a predetermined level.

7. In a fire extinguisher, a flexible transparent container for an extinguishing liquid and having a conical shape, a pressure-responsive nozzle-valve projecting from the apex of said container and comprising a hollow cylinder externally threaded and provided with a flange at one end, said cylinder extending through an opening in the apex of said container with the flange resting against the inner surface of the container, a nut threadably received on the cylinder to clamp said container between said flange and said nut, a piston slideable within said cylinder and having a longitudinal passage opening at one end into said container, a cap terminating the other end of said passage and nozzle bores adjacent said cap extending radially into said passage, means operative on said container to apply a compressive force thereto which is transmitted by said liquid to said piston, and a fuse strip looped across said cap normally to hold said piston in a position at which said nozzle bores are blocked within said cylinder.

8. A combined light fixture and fire extinguisher assembly comprising a light reflector having an opening therein, a flexible container for a fire-extinguishing liquid housed within said reflector, said container being provided with a pressure-responsive nozzle-valve projecting downwardly through said opening, thermally-responsive actuating means coupled to said nozzle to maintain said valve normally closed and to release said nozzle when the combined temperature exceeds a predetermined level, means operative on said flexible container to apply a compressive force thereto which is transmitted by said liquid to said valve, a drum for mounting said reflector on the ceiling, said reflector being detachably coupled to one end of said drum, and an annular lighting element surrounding said drum adjacent said cylinder.

9. An assembly, as set forth in claim 8, wherein said means operative on said flexible container comprises a pressure member in said drum interposed between the ceiling and the container in the reflector and provided with an expansion spring connected between a pair of plates and links connecting said plates to maintain said spring in a compressed state, said links each being provided with a fuse section.

10. An assembly, as set forth in claim 8, wherein said means operative on said container comprises a pressure member in said drum and provided with an expansion spring connecting opposed plates bearing against said ceiling and said container, respectively.

11. An assembly of the character described, comprising a conical rigid housing for mounting from a ceiling, said housing having an opening at the apex thereof, a flexible conical container for a fire-extinguishing liquid disposed within said housing and having a pressure-responsive outlet member extending through said opening, means to apply a compressive force upon said container, and actuator means to maintain said outlet member normally closed and to release said liquid when the ambient temperature rises above a given level.

12. An assembly as set forth in claim 11 wherein said container is provided with a neck extension and wherein said actuator means comprises a spring having opposing arms adapted to clamp said neck therebetween, and a fuse encircling said arms, said arms springing apart when said fuse is broken.

References Cited in the file of this patent

UNITED STATES PATENTS

2,023,848	Loewenstein	Dec. 10, 1935
2,497,286	Ashcraft	Feb. 14, 1950
2,522,962	Reger	Sept. 19, 1950
2,674,324	Mascarini	Apr. 6, 1954