Jan. 29, 1946. A. MATHISEN 2,393,860

FLAME AND TEMPERATURE RISE DETECTING DEVICE

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FIG. 1.

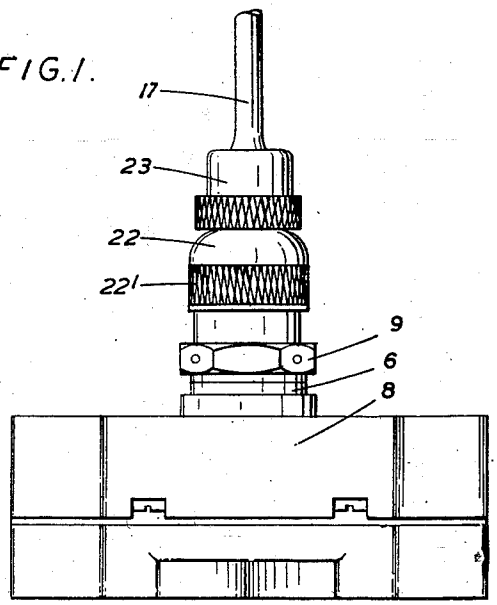
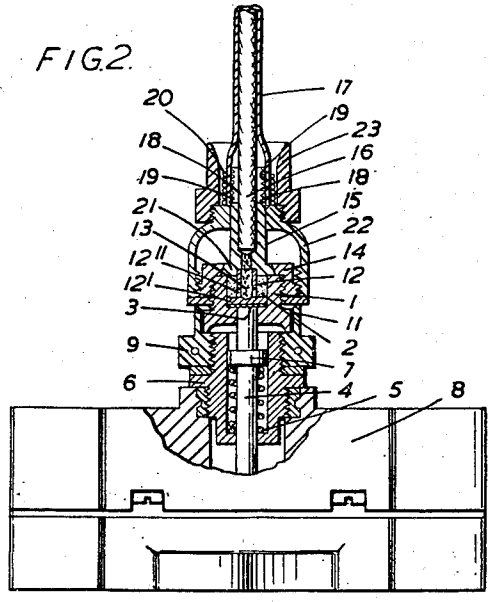


FIG. 2.



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FLAME AND TEMPERATURE RISE DETECTING DEVICE

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In Great Britain January 1, 1943

8 Claims. (Cl. 102—1)

This invention relates to improvements in flame and temperature rise detecting devices.

Flame and temperature actuatable devices are generally employed upon power plants such as aero engines and engines for military vehicles, tanks and the like, but a difficulty arises in quickly detecting flames or abnormal temperature increases at any specified point upon the power plant unless a considerable number of flame and temperature rise actuatable devices are employed.

It is the object of the present invention to provide a suitable means for detecting flames or abnormal temperature increases at various points upon a power plant.

According to the present invention, a flame and temperature detecting device is provided with a fine bore train or thread filled with a gun powder or fine explosive mixture, which extends through a projection, mounted on a cover of a chamber charged with an explosive mixture, this projection being enlarged to receive fuse material known as flash cord.

The flash cord may be enclosed in a protecting covering or sleeve which is resistant to oil, water and other liquids, the covering or sleeve being of such a nature that it does not appreciably retard ignition of the flash cord when a flame is applied at any point thereof.

The covering or sleeve may be in the form of flexible insulation or like material.

The free end of the projection is preferably split in the form of a collet and is preferably provided with serrations or screw threads externally on the collet jaws, the sleeve being forced over or threaded over the collet jaws and secured thereto by fine cord, wire or the like.

In order to prevent the projection and an attached cover portion from being blown away from the device, a cap may be fitted to the cover, this cap permitting of sufficient movement of a blown-out cover portion to enable switch mechanism in the device to be operated.

A shield may be secured to the cap to protect the collet jaws and the end of the sleeve secured thereto.

The shield is preferably funnel-shaped so as to prevent the flash cord and the sleeve or covering from being bent abruptly at the ends of the collet jaws.

The invention will now be described by way of example with reference to the accompanying drawing, wherein:

Figure 1 shows a side elevation of a flame and temperature detecting device.

Figure 2 shows a similar view, but to a larger scale, and with the upper portion in section.

As shown in the drawing, a flame and temperature detecting device is provided with a chamber 1 charged with a small amount of explosive mixture or gun powder 2. In the bottom of the chamber 1 is provided a fiber or like disc 3 against which bears a plunger 4 urged against the disc 3 by a spring 5. The spring 5 bears at one end against the bottom of a screwed member 6 and at the other end against a collar 7 on the plunger 4. The member 6 is screwed into a housing 8 containing suitable switch mechanism, such as described in the Mathisen et al. Patent No. 2,236,958, which is actuated by the plunger 4 when the charge 2 is exploded in the chamber 1.

On the member 6 is screwed a nipple 9 in which the chamber 1 is secured by a fusible sleeve 11 which will be melted by a sufficient temperature rise and permit the entire chamber 1 to come off.

In order to enable a device as above described to detect flames at various points upon a power plant, a fine bore train or thread 13 filled with gun powder or fine explosive mixture extends through a lower tubular projection 12 passing through a cover 14 screwed to the chamber 1. At the lower end of the projection 12 is provided a plate 12' bearing against the disc 3 while the projection 12 is also provided with apertures 12'' for forming a connection between the explosive mixture in the train 13 and the explosive mixture 2. An upper tubular projection 15 has an enlarged bore to receive fuse material 16, known as flash cord. The cord 16 extends several feet from the device, if desired, the cord 16 being mounted adjacent parts of the power plant most liable to fire or temperature increase risks.

In order to protect the flash cord 16 from contamination by oil, water and other liquids, a protecting sleeve 17 in the form of flexible insulation or like material is fitted over the flash cord 16. In order to secure the flash cord 16 and sleeve 17 to the projection 15, the upper end of projection 15 is split, as indicated at 18, in the form of a collet and is provided with external raised engaging portions as serrations or screw threads 19.

As shown in Figure 2, the flash cord 16 is fitted into the projection 15, while the flexible protecting sleeve 17 is forced over the threaded portion 19 of the collet jaws and secured thereto by fine cord, wire or the like 20, which latter causes

the threads or serrations 19 to bite into the inside of the sleeve 17.

The projection 15 is formed integral with a cover portion 21 which is fitted into the cover 14 in the manner described in said Patent No. 2,236,958.

In order to prevent the projections 12, 15 from being blown forcibly away from the explosive chamber 1, a cap 22 is screwed to the cover 14, the cap 22 being preferably milled on the outside as indicated at 23 for this purpose. The cap 22 is of a size to permit of sufficient movement of the cover portion 21 to enable the switch mechanism to function. The cover portion 21 attached to the projection 15 forms a rim or flange which is caught by the cap 22 to prevent the projections 12, 15 from becoming completely detached from the device.

To the cap 22 is secured a shield 23 which is funnel-shaped internally. The shield 23 protects the collet jaws and the sleeve 17 secured thereto and also prevents the flash cord 16 and sleeve 17 from being bent abruptly, at the ends of the enlarged portion 15, which bending may be likely to cause fracture of the cord 16 and the sleeve 17 at this point.

Instead of providing the flash cord 16 with a sleeve 17 as above described, the flash cord 16 may be produced with an oil, water and other liquid resisting covering of a nature which does not appreciably retard ignition of the flash cord 16 when a flame is applied at any point thereof since high speed operation is an essential requirement of the flame and temperature rise detecting device for use upon power plants and the like.

Having thus fully described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In a flame and temperature detecting device, the combination with a chamber charged with an explosive mixture, of a cover on said chamber, a projection mounted in said cover and extending to both sides thereof, the portions of said projection on opposite sides of said cover being of different cross-sectional area, the portion of smaller cross-sectional area extending into said chamber, said projection having an axial bore therein, said bore having different diameters and the bore of smaller diameter extending into said chamber, the portion of the projection extending into the chamber being apertured at the end thereof remote from the cover so as to provide communication between the chamber and the said smaller diameter bore, a train of explosive mixture in said smaller diameter bore, the end of the larger portion of said projection remote from said cover being split in the form of a collet, a length of flash cord, one end of said flash cord being located with said larger diameter bore and contacting with said train, a flexible protecting sleeve fitted over said flash cord, the terminal portion of said sleeve being forced over said collet, and retaining means surrounding the terminal portion of said sleeve and holding the same in tight engagement with said collet.

2. In a flame and temperature detecting device, the combination with a chamber charged with an explosive mixture, of a cover on said chamber, a projection mounted in said cover and extending to both sides thereof, the portions of said projection on opposite sides of said cover being of different cross sectional area, the portion of smaller cross sectional area extending into said chamber, said projection having an axial bore therein, said bore having two different diameters and the bore of smaller diameter extending into said chamber, the portion of the projection extending into the chamber being apertured at the end thereof remote from the cover so as to provide communication between the chamber and the said smaller diameter bore, a train of explosive mixture in said smaller diameter bore, the end of the larger portion of said projection remote from said cover being split in the form of a collet, said collet being serrated externally, a length of flash cord, one end of said flash cord being located within said larger diameter bore and contacting with said train, an insulating sleeve enclosing said flash cord, the end of said sleeve adjacent said collet being drawn over said collet, and flexible retaining means bound around said sleeve end for securing said sleeve end to said collet.

3. In a flame and temperature detecting device, the combination with a chamber charged with an explosive mixture, of a cover on said chamber, a projection mounted in said cover and extending to both sides thereof, the portions of said projection on opposite sides of said cover being of different cross-sectional area, the portion of smaller cross-sectional area extending into said chamber, said projection having an axial bore therein, said bore having two different diameters and the bore of smaller diameter extending into said chamber, the portion of the projection extending into the chamber being apertured at the end thereof remote from the cover so as to provide communication between the chamber and the said smaller diameter bore, a train of explosive mixture in said smaller diameter bore, the end of the larger portion of the projection remote from said cover being split in the form of a collet, said collet being serrated externally, a length of flash cord, one end of said flash cord being located within said larger diameter bore and contacting with said train, an insulating sleeve enclosing said flash cord, the end of said sleeve adjacent said collet being drawn over said collet, flexible retaining means bound around said sleeve end for securing said sleeve end to said collet, a cap secured to said cover, and a shield secured to said cap, said shield serving to protect said collet and the end of the sleeve secured to said collet.

4. In a flame and temperature detecting device, the combination with a chamber charged with an explosive mixture, of a cover on said chamber, a projection mounted in said cover and extending to both sides thereof, the portions of said projection on opposite sides of said cover being of different cross-sectional area, the portion of smaller cross-sectional area extending into said chamber, said projection having an axial bore therein, said bore having two different diameters and the bore of smaller diameter extending into said chamber, the portion of the projection extending into the chamber being apertured at the end thereof remote from the cover so as to provide communication between the chamber and the said smaller diameter bore, a train of explosive mixture in said smaller diameter bore, the end of the larger portion of the projection remote from said cover being split in the form of a collet, said collet being serrated externally, a length of flash cord, one end of said flash cord being located within said larger diameter bore and contacting with said train, an insulating sleeve enclosing said flash

cord, the end of said sleeve adjacent said collet being drawn over said collet, flexible retaining means bound around said sleeve end for securing said sleeve end to said collet, a cap secured to said cover, and a shield secured to said cap, said shield serving to protect said collet and the end of the sleeve secured to said collet, said shield having a funnel shaped bore so as to prevent said flash cord and said sleeve from being bent abruptly at the end of the collet.

5. In a flame and temperature rise detecting device for actuating a control member, a retaining unit, explosive means comprised in said retaining unit and adapted upon ignition to fracture said retaining unit, a stud projecting externally from said retaining unit, said retaining unit and said stud having a continuous bore extending therethrough and communicating with said explosive means, the free end of said stud being split and forming a collet, a length of flash cord having its terminal portion received within a portion of the bore of said stud, a train of ignitable material extending through said bore from the end of said flash cord to said explosive means, and a flexible protective sleeve fitted over said flash cord, the terminal portion of said sleeve being forced over said collet and engaging the same.

6. A device as set forth in claim 5, and circumferential retaining means surrounding the terminal portion of said sleeve and holding the same in tight engagement with said collet.

7. A device as set forth in claim 5, said collet being provided externally with raised sharp engaging portions positioned to engage the terminal portions of said sleeve, and filar retaining means wound externally around the terminal portion of said sleeve and holding the same in tight engagement with said collet.

8. A device as set forth in claim 5, and a funnel-shaped shield member surrounding said collet and the terminal portion of said sleeve fitted over said collet for protecting said sleeve and said flash cord.

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