Oct. 31, 1961 R. SHEPHERD 3,006,408

FLASHBACK RETARDER ARRANGEMENT FOR FIRED EQUIPMENT

Filed July 31, 1958

Fig. 1.

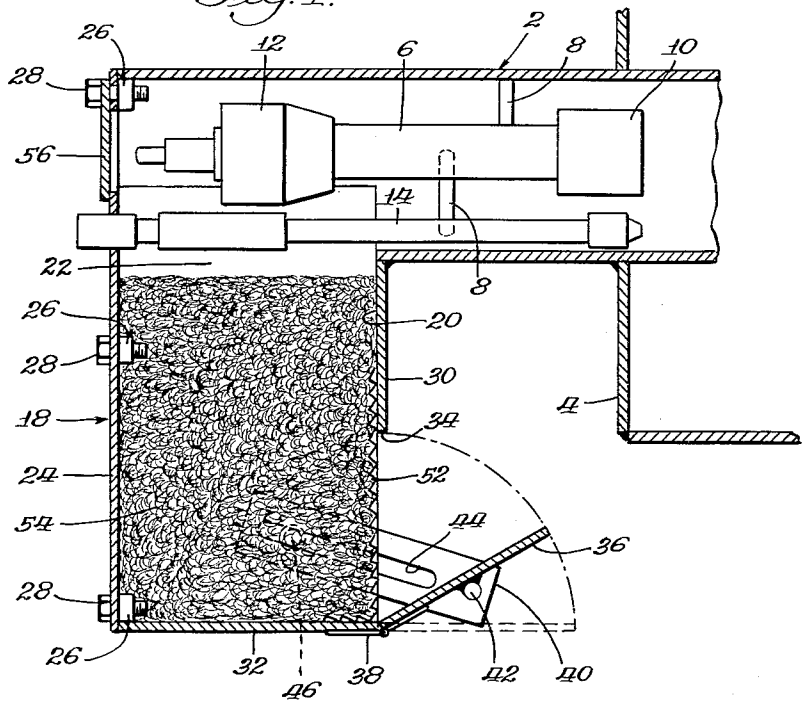


Fig. 2.

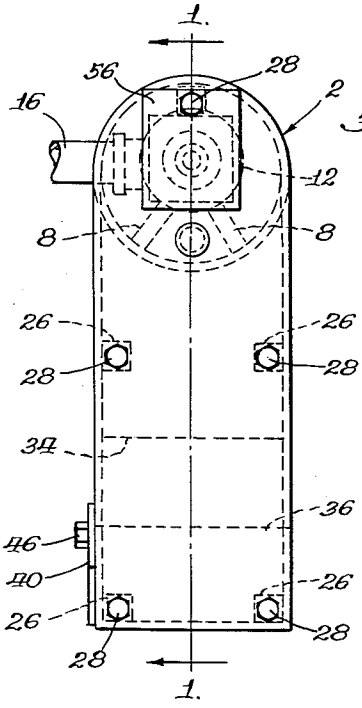
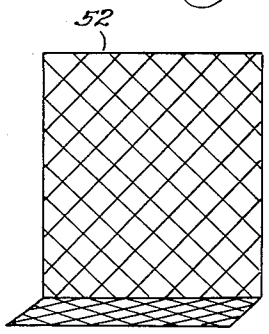


Fig. 3.



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United States Patent Office 3,006,408
Patented Oct. 31, 1961

3,006,408

FLASHBACK RETARDER ARRANGEMENT FOR FIRED EQUIPMENT

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Filed July 31, 1958, Ser. No. 752,226
1 Claim. (Cl. 158—112)

The invention relates to flashback retarder arrangement for fired equipment, and particularly to a hood arrangement associated therewith mounted as a draft arrangement in relation to the intake of the fire box.

While the invention may have broader application, it has been designed to have particular utility in association with oil field treating and heating equipment because of the dangerous condition that is known to exist in and around such a location. Experience has shown that frequent fires occur around oil field heaters and reboilers due to the accidental ignition of gas and vaporized petroleum products that may be in the atmosphere immediately adjacent said equipment in a critical saturation range. Faulty pipe connection, as well as leaking petroleum product, is of course responsible for inflammable material being available in areas immediately adjacent such equipment. Flashbacks during the ignition of fired equipment present an open flame to this combustible atmosphere, which initiates the fires or explosions which, of course, result in the loss of costly equipment as well as in the loss of product, both gas and petroleum, and extremely costly shut-down to the producer.

It is, accordingly, a general object of the disclosed invention to provide a design of equipment of the type here under consideration that will not only improve combustion in the fired equipment but will additionally prevent flashbacks by proper draft control through a burner hood.

It is a further specific object of the invention to provide a draft arrangement of the type here under consideration which additionally avoids hazard to the operators.

These and other objects of the invention will become apparent in the course of the following description, and from an examination of the associated drawings, wherein:

FIGURE 1 is a cross sectional view, partly in elevation, and taken along lines 1—1 of FIGURE 2,

FIGURE 2 is an end elevational view of the structure shown in FIGURE 1, and

FIGURE 3 is a detail view of the retaining material employed in association with the draft opening.

Describing the invention in detail, attention is first directed to FIGURE 1 wherein the numeral 2 indicates generally a horizontially located, elongated, hollow fire casing. While the hollow casing 2 may be of any geometric pattern, it is preferably cylindrical, as indicated in FIGURE 2. The wall of a fire box 4 of the fire equipment (not shown) here under consideration is indicated at the right-hand end of the casing 2. It will be noted that the casing 2 projects inwardly of the wall 4, whereat the fire of the fired equipment will be contained. A conventional fuel delivery arrangement 6 is axially supported in any convenient manner, as for example, by plates 8, 8 in the casing 2. This arrangement, of course, comprises a conventional burner tip 10 at one end thereof as well as an air mixing valve arrangement 12 at the other end thereof. Immediately below the fuel delivery arrangement 6, and also extending axially of the casing 2, a pilot light fuel delivery device 14 may also be conventionally mounted in the casing 2. Of course, the fuel delivery arrangement as well as the pilot device are conventional elements in the art, and are therefore not per se part of the disclosed invention. A fuel feed-in line

16 is arranged to extend through one side of the casing 2 and operatively connect to the mixer 12.

A burner hood, indicated generally at 18, is mounted on the outer extremity of the casing 2, said burner hood 18 being formed of a plurality of plates defining a box-like inner chamber 20. The chamber 20, as indicated in FIGURE 1, communicates with the hollow casing 2 (as at 22) immediately below the mixer 12. The chamber 20 is additionally defined by a plate 24 which closes the outer end thereof and also extends upwardly to close the adjacent end of the hollow casing 2. Nuts 26, 26 which are secured to the hood 18 and casing 2 cooperate with bolts 28, 28 to provide for said mounting of the plate 24.

The chamber 20 is further defined by a plate 30 on a side thereof adjacent the fire box 4. The plate 30 is a partial plate in that it defines with a lower plate 32 an opening 34 which accommodates communication between the chamber 20 and the adjacent atmosphere. An adjustable air door 36, of such size that it will register with the opening 34, is pivotally connected to the hood 18 as, for example, by means of a hinge 38. A door opening control plate 40 is provided with a pivotal connection as at 42 to the door 36 and is further provided with an elongated slot 44 running lengthwise thereof. The plate 40 is arranged to abut one side of the hood and additionally a screw 46 is arranged to telescope through the slot 44 and to be threadably received in the hood 18. By virtue of this structure, the door 36 may be positioned selectively to vary the opening 34 from a fully closed position to a fully open position.

Directing attention to the chamber 20, it will be noted that a flattened, expanded metal element 52 is so positioned in the chamber 20 as to abut the inner surface of the plate 30 and to cover the opening 34. The entire chamber 20 is then packed with a woven mesh material, preferably a non-corrosive metallic material such as stainless steel, which is prevented from moving outwardly of the opening 34 by the element 52. The packed material, of course, provides a plurality of tortuous paths therethrough, the purpose of which will hereinafter be described.

In the operation of the arrangement, when it is desired to activate the pilot device 14, the operator may have access thereto by pushing aside a pivoted cover plate 56 and obtaining entrance to the inside of the casing 2 via a hole or aperture 58 formed in the plate 24 at the rear end of the casing 2. The equipment, of course, generally is fired automatically, using any conventional thermostatic control. Air to the mixer 12 is provided, which enters at the opening 34, passes through the meshed material 54 and upwardly to the mixer arrangement 12 for association with the fuel to induce firing. The large volume of packed material 54 effectively strains the incoming air and aids in preventing foreign matter from being conducted to the operating parts which may cause contamination and faulty operation. In addition, the large volume of packed meshed material 54 also dampens the incoming air and thereby avoids gusts which may accidentally put out the pilot equipment. The adjustable air door 36 may be selectively set to vary the size of the opening 34 and thereby provide a draft which is consistent with the climatic conditions existing during the particular operating cycle.

Of particular interest in the disclosed invention is the fact that the wire mesh material effectively prevents, during a flashback condition, flame from passing therethrough and communicating with the atmosphere via the opening 34, which in the past has caused accidental fires in the operation of this type of equipment. The wire mesh of the material 54 being metallic, is also effective to aid in conducting heat away from the burning

gas thereby preventing an igniting temperature from existing in the areas of the opening 34 adjacent the atmosphere. In addition to offering an improved function and operation, the disclosed arrangement is simple of construction and economical from the standpoint of initial cost.

The invention as shown is by way of illustration and not limitation and may be subject to various modifications without departing from the spirit thereof or the scope of the appended claim.

What is claimed is:

Apparatus for use with a firebox associated with burner equipment, said apparatus comprising an elongated hollow casing adapted to be attached at one end to the firebox, fuel supply means extending in said casing, the end of the casing adapted to be attached to the firebox and being in open communication with said firebox, an air inlet means located adjacent the end of said casing remote from the firebox, a hood enclosure secured to said casing and having an open end in registry with the air inlet means, said hood enclosure being provided with an

opening means and defining a chamber between the air inlet means and the opening means, an air pervious material substantially filling said chamber, a portion of the material extending across the air inlet means of said casing to be in intimate thermal association with the fuel supply means in said casing, thereby to conduct heat away from the fuel supply means to lower the temperature adjacent the fuel supply means, permeable retaining means overlying said opening means to maintain said pervious material in said chamber, and closure means supported by said hood enclosure to coact with its opening means to control the quantity of air passing through said opening means.

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