Title: SELF EXTINGUISHING ROOM FOR EXTINGUISHING OIL AND GAS WELLS

Abstract: A self extinguishing room for extinguishing oil and gas wells is provided. The self extinguishing room comprises a housing in which extinguishing materials are filled. The upper portion of said housing is a truncated cone, while a lower portion is a cylinder body. A primary hole is arranged on said truncated cone. Pressure balancing holes are arranged on the side face of said truncated cone for expelling large quantities of extinguishing materials. A control valve is arranged on the side face of said cylinder body for self extinguishing materials. A gasket is installed on the bottom surface of said cylinder body. The self extinguishing room can reduce danger from the gas well. In addition, the self extinguishing room can save the environment by shortening the time on fire, shorten the time on fire, and reduce harmful substances produced by fire disaster.
SELF EXTINGUISHING ROOM FOR EXTINGUISHING OIL AND GAS WELLS

FIELD OF THE INVENTION

The present invention relates to a funnel type second generation self extinguishing room, which is connected with an extinguishing system, especially an extinguishing system of oil and gas wells and an extinguishing device associated with oil and gas wells.

BACKGROUND OF THE INVENTION

The extinguishing process may be performed in many ways. For example, large quantities of extinguishing materials are ejected for extinguishing. Fire trenches may be formed next to the gas well on fire to reach the point on fire from the bottom. Large quantities of concrete may be placed on the spout of well, or a tall pipe may be placed on the spout of well to raise flames. In addition, explosion may be utilized for extinguishing. In case of explosion, the extinguishing materials may be expensive, and it may damage the equipments around the gas well on fire and waste time. As a result, the time for extinguishing may last for several weeks or months. Large expensive equipments are used for prolonged time, and this may bring about damage to the pipelines at the bottom of wells. Large quantities of fuels (oil or gas) are wasted, and this will pollute the environment. In addition, these have significant influences on the people's living, and the pollution of environment is involved with loss of important energy resources in most countries, and thus is considered as large economic loss. There are also damages from the process of cleaning these materials and burning fuels, because they may introduce a long term pollution, which may require large quantities of fund. These remnants of the fire disaster may be spread to remote places via rivers or air,
and this may lead to danger to the human, animals, birds, and plants. The current situation makes it clear that the method used in the fire disaster is not efficient. Therefore, it is necessary to find an alternative method which may save time, energy and money and reduce the danger mentioned above. A previous invention has got a certificate authentication under an industrial model certificate No. 1131 on February 28, 2010 from King Abdul-Aziz City for Science and Technology (KACST), and has been registered in Gulf Cooperation Council Patent Office under OP/B/2007/7575 on January 7, 2007. It is noted that irregular ejection of large quantities of burning materials may lead to a high pressure in the extinguishing room for some wells, which is sufficient to cause ejection of the extinguishing room itself, and to result in failure of the above invention. To overcome this dilemma, the weight of the system is increased, so that the system is more stable. The inventors also add some advantages to the system. For example, some holes are formed in the side part of the extinguishing room. The holes automatically operate in case that the pressure increases, and automatically closes in case that the pressure decreases. In this way, the operation time is reduced to some minutes, instead of several weeks. As a result, it is possible to save time, energy and money, and save the lives of firemen. The self extinguishing room can reduce danger from the gas well. In addition, the self extinguishing room can save the environment by shortening the time on fire, shorten the time on fire, and reduce harmful substances produced by fire disaster.

**SUMMARY OF THE INVENTION**

The object of the invention is to overcome the drawbacks in the prior art by providing a self extinguishing room which can reduce danger from the gas well, can save the environment by shortening the time on fire, shorten the time on fire, and can reduce harmful substances produced by fire disaster.

In order to achieve the above object, the technical solution of the invention relates to a self extinguishing room for extinguishing oil and gas wells,
characterized in that, said self extinguishing room comprises a housing in which extinguishing materials are filled, an upper portion of the housing is a truncated cone while a lower portion is a cylinder body, a primary hole is arranged on said truncated cone, pressure balancing holes are arranged on the side face of said truncated cone, a hose is further installed on the side face of said truncated cone for ejecting large quantities of extinguishing materials, a control valve is arranged on the side face of said cylinder body for self extinguishing materials, and a gasket is installed on the bottom surface of said cylinder body.

A hole cover is hinged on said pressure balancing holes, and a restoring spring is installed between said hole cover and housing.

A spring for opening the control valve is installed on said control valve.

A multilayered primary hole cover is arranged on said primary hole.

On the surface of said housing and hose, a thermal insulating layer is provided and fire resistant materials are coated.

The present invention is a self extinguishing room of the second generation. The present invention can be regarded as the second mode of a previous invention which has got a certificate authentication under an industrial model certificate No. 1131 on February 28, 2010 from King Abdul-Aziz City for Science and Technology (KACST), and has been registered in Gulf Cooperation Council Patent Office under OP/B/2007/7575 on January 7, 2007. Through the previous invention, we find that it may fulfill such a mission. The second generation of self extinguishing room ejects extinguishing materials inside one or all funnels. By mixing the extinguishing materials and burning materials, it is possible to reduce the concentration of the burning materials. The extinguishing materials include, but not limited to dry powder carbon dioxide as well as other materials which may be used in a fire disaster. The funnel may suppress flames, and may isolate flames from oxygen in the surrounding air. The funnel may further save in a more efficient way the space which is required for fusing the vapor of burning materials and the
extinguishing materials. The extinguishing materials are ejected in an appropriate amount to decrease the concentration of flowing materials. Besides, the flowing materials and extinguishing materials are mixed to a concentration lower than the concentration which is necessary for burning these materials. During the use of the self extinguishing room, the balance between the ejection pressure of burning materials and the ejection pressure of extinguishing materials is controlled by ventilation holes. Since the pressure balance is controlled appropriately, it is possible to mix the burning materials and extinguishing materials without influencing the conditions of the extinguishing room or reducing its efficiency of operation, and to obtain a more accurate result. The bottom of funnel may be placed on the ground or water surface. The bottom has a diameter of about 3-4 meters, to inhibit the extinguishing materials or releasing the extinguishing materials from the upper portion hole. In case that the extinguishing materials are mixed with vapor of the burning materials (flames), it is possible to extinguish more efficiently. The funnel may be formed by a strong and heat resistant material, or coated with one or more layers of heat insulating material on the inside. The funnel may be molded to have a circular, triangular, or square shape, or may be formed to have a pyramidal or wave shape. The bottom of the funnel may extend in parallel in a small, intermediate and large complex shape, according to the position, height, size, and amount of flowing materials of the well. The extinguishing materials are ejected from a specific tank placed on the funnel surface. The hose is designed to eject materials under a high pressure. The outside of the hose is protected by a heat insulating material, and is covered tightly. The extinguishing materials are ejected according to the desired temperature and susceptibility of the heat insulating materials, and are ejected automatically when contacting the surface near the gas well. The funnel may be moved by a helicopter or along a bridge extending to the well, or may be moved by a remote controlled transportation tool. Cares are taken in design that the burning substances ejected by the well should be located below the
bottom of the funnel, and that the funnel should have a diameter corresponding to the flame or slightly smaller than the diameter which is effective for mixing the flame and extinguishing materials. For these reasons, many measures have been applied in the single funnel hole. Upon placing the funnel over the substances ejected by the gas well on fire, the funnel should be fixed as much as possible, and this is primarily achieved by the weight of the funnel. The bottom surface of the funnel faces the surface surrounding the well, to prevent extinguishing materials from leaking from the funnel and prevent the surrounding air from entering the funnel. The extinguishing materials in the funnel are automatically ejected, until the flames are extinguished. Once the gas well on fire extinguishes, a cooling process is initiated. The cooling process is preferably performed before and during extinguishing process. Any suitable material in the surrounding is used to facilitate cooling the well, so as to prevent the flames from burning again.

The invention presents the following advantages and beneficial effects. In the second mode of the self extinguishing room for extinguishing oil and gas wells, the weight of the system is increased, so that the system is more stable. The inventors also add some advantages to the system. For example, some holes are formed in the side part of the extinguishing room. The holes automatically operate in case that the pressure increases, and automatically closes in case that the pressure decreases. In this way, the operation time is reduced to some minutes, instead of several weeks. As a result, it is possible to save time, energy and money, and save the lives of firemen. In this way, the self extinguishing room can reduce danger from the gas well. In addition, the self extinguishing room can save the environment by shortening the time on fire, shorten the time on fire, and reduce harmful substances produced by fire disaster.

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a top view showing the internal components of the self
extinguishing room of the invention;

FIG. 2 is a top view showing the self extinguishing room of the invention;

FIG. 3 is a sectional view showing pressure holes in the self extinguishing room of the invention; and

FIG. 4 is a side view showing the self extinguishing room of the invention.

DETAILED DESCRIPTION OF THE INVENTION

The specific implementations of the invention will further be described with reference to the drawings and embodiments. The following embodiments only intend to illustrate the technical solutions of the present invention more clearly, but do not intend to restrict the protection scope of the present invention.

As shown in FIGs. 1-4, the subject matter of the invention relates to a self extinguishing room for extinguishing oil and gas wells. The primary concept of the present invention will be presented during description thereof. The reference numeral FIG. 1-1 indicates the component 1 in FIG. 1, and FIG. 4-2 indicates the component 2 in FIG. 4.

FIG. 1 comprises primary components of the present invention. 1-1 is pressure balancing holes. 1-2 is a cylinder for extinguishing materials, and 1-3 is a hose for ejecting large quantities of extinguishing materials. The hose is used to eject extinguishing materials into the funnel. The hose may withstand a high pressure, may be provided with a heat insulating material from outside, and may be arranged in different configurations. FIG. 2 is a top view of the present invention. FIG. 2-1 is a control valve for self extinguishing materials. When contacting the surface surrounding the gas well on fire, the control valve is activated. When the funnel is rising, the control valve is opened by a spring or is closed by placing an appropriate weight. FIG. 2-2 is a pressure balancing hole(s). FIG. 2-3 is a primary hole of the present invention. The primary hole is designed in different ways, and comprises multiple layers. The diameter of a lower layer is larger than that of an upper layer, so that the flame overflows at the lower layer. FIG. 3 shows the shape of pressure balancing holes. FIG. 3-1
indicates a state in which the pressure balancing hole cover is opened when the pressure is increased. FIG. 3-2 indicates a state in which the pressure balancing hole cover is closed when the pressure is decreased. FIG. 3-3 is a spring for controlling the pressure balance. FIG. 3-4 is an outer surface (cover) of the invention. FIG. 3-5 is an internal surface of the invention. FIG. 4 is the outline of the invention. FIG. 4-1 is a primary hole of the invention, which is designed in different ways. FIG. 4-2 is a pressure balancing hole. FIG. 4-3 is a plate which moves up and down when the surface surrounding the gas well on fire is out of balance.

The preferred embodiments of the invention have been described above. It will be appreciated by the ordinary skilled in the art that modifications and improvements can be made without departing from the technical principle of the present invention. These modifications and improvements should also be considered to fall within the protection scope of the invention.
1. A self extinguishing room for extinguishing oil and gas wells, characterized in that, said self extinguishing room comprises a housing in which extinguishing materials are filled, an upper portion of the housing is a truncated cone while a lower portion is a cylinder body, a primary hole is arranged on said truncated cone, pressure balancing holes are arranged on the side face of said truncated cone, a hose is further installed on the side face of said truncated cone for ejecting large quantities of extinguishing materials, a control valve is arranged on the side face of said cylinder body for self extinguishing materials, and a gasket is installed on the bottom surface of said cylinder body.

2. The self extinguishing room for extinguishing oil and gas wells according to claim 1, characterized in that, a hole cover is hinged on said pressure balancing holes, and a restoring spring is installed between said hole cover and housing.

3. The self extinguishing room for extinguishing oil and gas wells according to claim 1, characterized in that, a spring for opening the control valve is installed on said control valve.

4. The self extinguishing room for extinguishing oil and gas wells according to claim 1, characterized in that, a multilayered primary hole cover is arranged on said primary hole.

5. The self extinguishing room for extinguishing oil and gas wells according to any one of claims 1-4, characterized in that, on the surface of said housing and hose, a thermal insulating layer is provided and fire resistant materials are coated.
Fig 1
Fig4
INTERNATIONAL SEARCH REPORT

International application No. PCT/CN2012/080181

A. CLASSIFICATION OF SUBJECT MATTER

According to International Patent Classification (IPC) or to both national classification and IPC

E21B 35/00 (2006.01) i

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: E21B 35

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CPRSABS, SIPOABS, DWPI: cone, pressure, spring

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C.

* Special categories of cited documents:
  "A" document defining the general state of the art which is not considered to be of particular relevance
  "E" earlier application or patent but published on or after the international filing date
  "L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)
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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search
13 Nov. 2012 (13.11.2012)

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

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