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Reagan

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[54] **MULTIPLE FLARE STACK SUPPORT SYSTEM**

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[52] **U.S. Cl.** **431/202,** 431/279, 239/273

[51] **Int. Cl.** **F23d**

[58] **Field of Search** 431/202, 279; 239/587, 239/273

[56] **References Cited**

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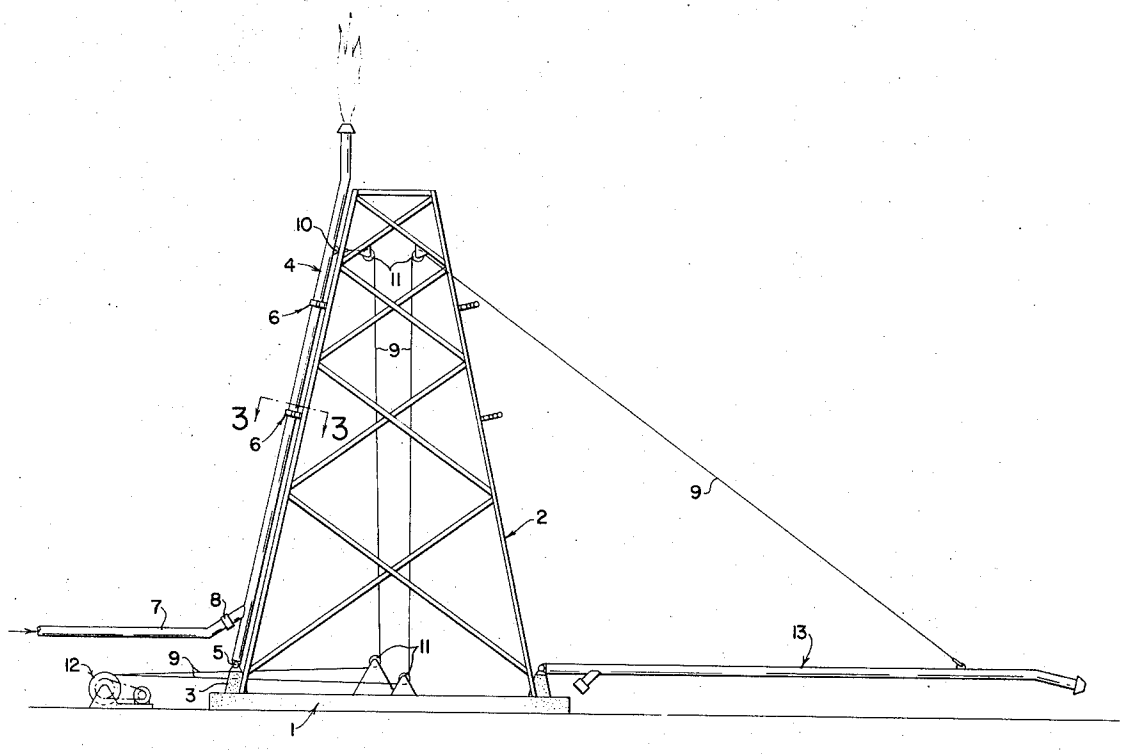
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[57] **ABSTRACT**

The invention is a multiple flare stack support system consisting of a base vertically extended from a horizontal surface, said base having an outer surface and an inner surface. On the outer surface of said base, two or more flare stacks are pivotably mounted in such manner that the top of the flare stack can be conveniently lowered away from the base for maintenance.

3 Claims, 3 Drawing Figures



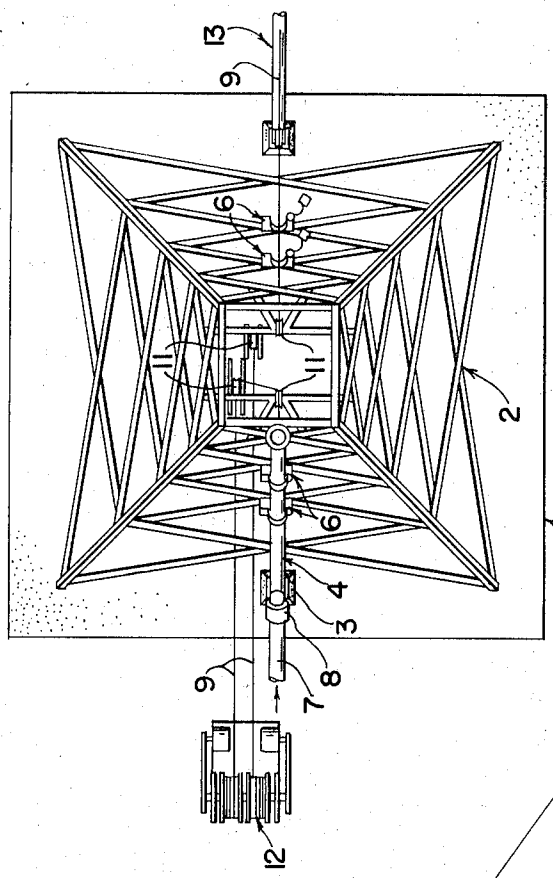


FIG. 2

FIG. 1

FIG. 3

MULTIPLE FLARE STACK SUPPORT SYSTEM

BACKGROUND OF THE INVENTION

Flare stacks are well known in petroleum refining, see for example, Safety in Petroleum Refining and Related Industries, Armistead, John G. Simonds, & Co., Inc., New York, 1952, at pages 188–194. Due to the hazards of fires, these flares must be separated from the plant by a considerable distance. Accordingly, large amounts of land are required to accommodate flares.

Two flares have been constructed on one base. See Foster Wheeler Corporation Heat Engineering, July–August 1971, Livingston, N.J. These flares have been constructed inside of a support structure. Such a design in undesirable and dangerous because work on a flare stack is done almost exclusively under the rigging and immediately adjacent to an operating flare.

SUMMARY OF THE INVENTION

It has now been discovered that the drawbacks of the flare structures of the art can be avoided using the multiple flare support system of the present invention. The invention is a multiple flare support system comprising:

A base vertically extended from an essentially horizontal surface, said base having an outer surface, and

Two or more flare stacks each having a top end and a bottom end, each of said flare stacks being vertically disposed along the outer surface of the base and pivotably mounted to said base or said horizontal support around a pivot point located along the bottom half of said flare stack, said flare stack being mounted to the base in such a manner that the top of said flare stack can be lowered to a point which is below the top half of said base by pivoting said flare stack about said pivot point in a direction away from said base.

Using the present invention, the flares are easily maintained in a safe manner while at the same time, interruption of other flares mounted on the same base is avoided. The flare design of the invention makes it possible to conduct repairs without operating under the base; it makes maintenance operation immediately adjacent to working flare stacks unnecessary; and it does not require extensive quantities of land for more than one flare. All of these features make the flare system of the invention most desirable for a crowded refinery operation.

The base structure of the present invention is placed on an essentially horizontal surface. The surface is usually the ground or a concrete slab although other supports may be employed. The level at which the base and the horizontal surface meet is herein defined as the "grade level."

The base may have any suitable shape so long as it supports the flare stack in a vertically extended position. Normally, the base structure is a derrick, but it may also have a rectangular shape or any other shape suitable for supporting the flare stack. All of the base structures employed in the invention have an outer surface.

The flare stack is normally a tube which is pivotably mounted on the base or on the horizontal support. The flare stack has a top end and a bottom end and may have a diameter of a few inches to 3 feet or more. The size and shape of the flare stack depend essentially on the use for which it is employed. Suitable flare stacks are well known in the art.

In addition to the basic tube structure of the flare modifications, such as special flare tips, may be added to the top end of the flare stack. Thus, the conventional design of the flare is essentially retained while the present invention is employed. The present invention, however, provides a more convenient method of maintaining and repairing of the flares.

As noted, the tip of the flare, in the broadest concept of the invention, can be lowered below the top half of the base. In the preferred practice of the invention, however, multiple flare systems where the tip of the flare stack can be lowered away from the base to a point within the close proximity of grade level are employed. Such lowering of the flare allows the most convenient repair operations on the flare stacks.

In the present invention, two or more flare stacks are employed using the same base. Such multiple flares eliminate the need for taking the large quantities of land that would be required for separate flare structures. In the preferred practice of the invention two to four flares would be mounted on a single base. Of course, more than four flares could be attached to one base, but problems of transporting the flare gases over extended distances may make such operation economically undesirable.

The flare stack is pivotably mounted on the base or on the horizontal support in such manner that the flare tip can be lowered away from the base. The location of the pivot may vary. Preferred pivot points, however, are located at a point along the lower half of the flare stack. In the most preferred practice of the invention, the pivot is located on the grade level, normally mounted to a concrete horizontal support.

In the operational flare position where gases are being burned, the flare stack is attached to the base in a secure manner. This assures that the flare stack will not be adversely affected by the wind or vibration caused by the flow of gases through the stack.

From the operational position, the flare is easily lowered to a position where maintenance can be conducted. In this procedure, the flow of gases to the flare is terminated, and the fasteners holding the flare stack to the base are released.

The flare is then pivoted about a point along the lower half of the stack. Very important in the present invention, is the fact that the flare stack is pivoted away from the base. The exact direction of the movement of the stack to the maintenance position is not important so long as the tip of the flare in the maintenance position is located away from the base.

Numerous mechanical devices can be employed to lower the flare from an operational position to the maintenance position. Specific examples of such methods include the use of a cable and pulley arrangement, the use of a crane or a combination of the two.

After the maintenance operations are conducted, the flare stack is conveniently restored to its operational position. Significantly, in the present invention, all of the repair operations on the flare are accomplished without interruption of the remaining operational flares. Moreover, at no time are workmen required to work under the base, nor are operations closely adjacent to operating flares necessary.

PREFERRED EMBODIMENT OF THE INVENTION

FIG. 1 is a side view of the stack support system, FIG. 2 is a top view, and FIG. 3 is a close-up of the fastener mechanism.

FIG. 1 shows a concrete slab horizontal support 1. On the horizontal support 1 are mounted a derrick base 2 and a pivot support 3. Flare stack 4 is pivotably attached at pivot point 5 to the pivot support 3 and extends along the outer surface of the derrick 2. The flare stack 4 is secured to the outer surface of the derrick by a plurality of fasteners 6. Flare gas feed pipe 7 is attached to the flare stack 4 at point 8 in such manner that the gases which will be burned in the flare are communicated from the flare gas feed pipe 7 to the flare stack 4.

Cable 9 is attached to the flare stack at point 10. Cable 9 is communicated through appropriate pulleys, 11 to a winch 12 which is outside of the close proximity of the derrick.

To bring the flare stack from the operational position to a position for repair, the flare gas feed is terminated, flare gas feed pipe 7 is detached from the flare stack 4 at point 8. The fasteners 6 are released. The flare stack 4 is pivoted away from the derrick about point 5 by the use of a pulling force such as a crane, and the flare stack 4 is lowered away from the derrick 2 while being restrained by cable 9. The flare stack is lowered to the maintenance position which is shown by flare stack 13.

After the appropriate repair of the flare stack and flare tip, the flare is again placed in the operating position by raising the flare using cable 9. The rest of the assembly is essentially the reverse of the maintenance procedure.

In the same manner as shown by the illustration, other bases and designs are employed. Also, more than two stacks, for example four flares, are conveniently mounted on the outer surface of a derrick.

In a manner very similar to the illustration, a pivot support can be mounted on the derrick at a point along the lower half of the flare stack. In the same manner, then, the flare stack is pivoted around the pivot point on the derrick so that the tip of the flare can be lowered below the top of the base.

I claim:

1. A multiple flare stack support system useful for burning undesirable gases, comprising:

A base consisting of a derrick vertically extended from an essentially horizontal support, said base having an outer surface, and

Two or more flare stacks each having a top end and a bottom end, each of said flare stacks being vertically disposed along the outer surface of the base and pivotably mounted to said base or said horizontal support around a pivot point located along the bottom half of said flare stack, flexible line connected to the upper half of each flare stack, and each line passing through a top portion of said derrick over a pulley and extending toward said horizontal support, said flare stacks being mounted to the base in such manner that the top of said flare stack can be lowered to a point which is below the top half of said base by pivoting said flare stack about said pivot point in a direction away from said base.

2. The multiple flare stack support system of claim 1 wherein the top of the flare stack can be lowered to within the close proximity of the horizontal support.

3. The multiple flare stack support system of claim 1 containing two to four flare stacks.

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