Dec. 14, 1954 J. B. HENWOOD 2,696,875

STACK LIGHTER

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FIG. 1

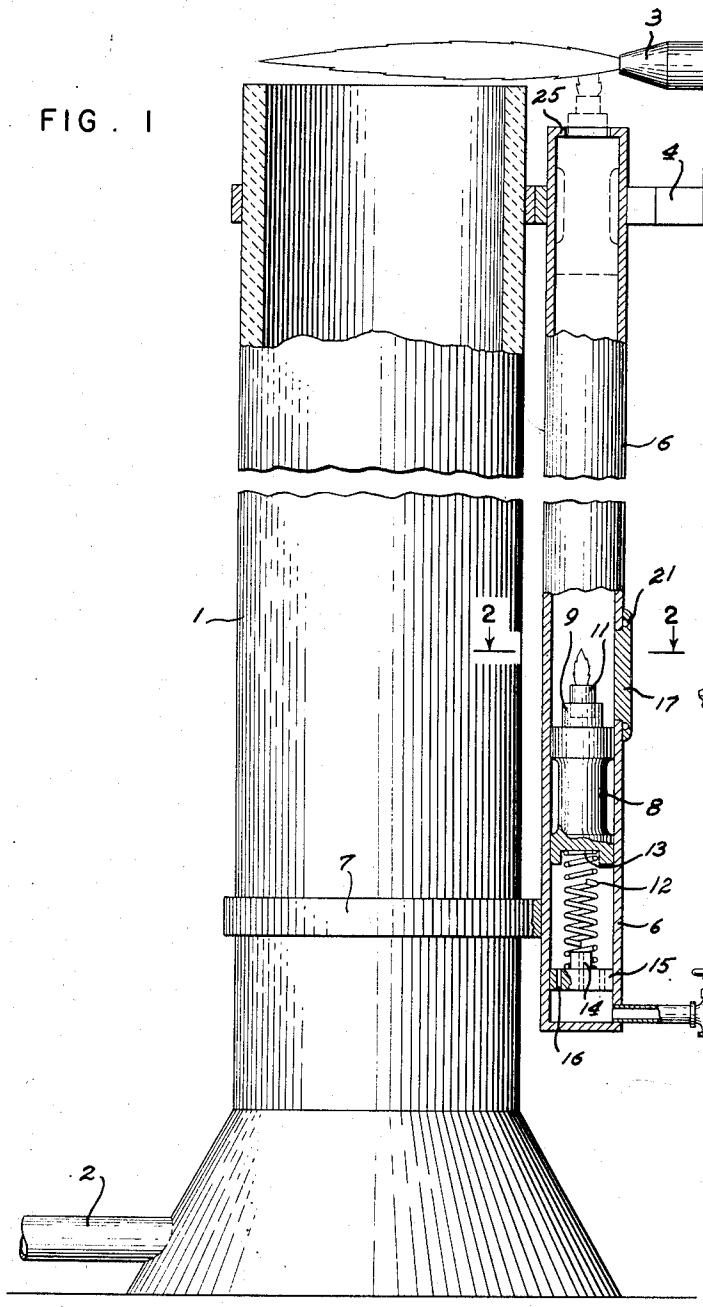
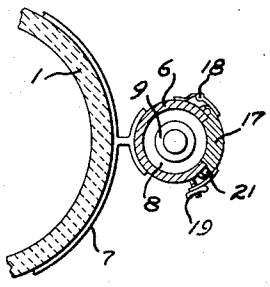


FIG. 2



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STACK LIGHTER

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8 Claims. (Cl. 158—115)

The present invention relates to apparatus for use in igniting combustible gases as they issue from the top of a tall stack.

In chemical process plants, and especially oil refineries, waste combustible gases are often vented to the atmosphere through tall stacks or chimneys usually from 125 to 250 feet in height. The combustible gases are frequently heavier than air, and to prevent them from being swept down to the ground where they might be ignited and cause damage, they are usually ignited as they leave the stack.

The problem of igniting the gases at the top of a tall stack, and keeping them ignited is serious. Workmen are reluctant to perform the task by hand because of the height of the stack, and because of the danger of a flash explosion due to an accumulation of gases near the top of the stack prior to the time ignition takes place. Several automatic devices have been suggested, but they have not been too satisfactory because of the servicing problems.

According to the present invention a pilot burner for igniting combustible gases as they issue from the stack is attached thereto near the top with the pilot burner directing its flame across the mouth of the stack. The pilot burner may be ignited when desired by a flare that is mounted on a piston movable in an elongated cylinder located adjacent to the stack and extending from the base to near the top thereof. The piston is forced to the top of the stack by air pressure, and returns to the bottom under the action of gravity.

It is a primary object of the invention to provide a simple and efficient device for igniting gases vented from the top of tall stacks. It is a further object of the invention to provide a means for igniting combustible gases as they are exhausted from an inaccessible place.

A more specific object of the invention is to provide a means to move an igniting flame in front of a burner that is located in an inaccessible position. A further object of the invention is to move a flame from ground level to the top of a tall stack by pneumatic means.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, however, its advantages and specific objects attained with its use, reference should be had to the accompanying drawings and descriptive matter in which I have illustrated and described a preferred embodiment of the invention.

In the drawings:

Figure 1 is a view, partly in section, of the apparatus; and

Figure 2 is a view taken on line 2—2 of Figure 1.

There is shown at 1 a stack or chimney of the type that is used in chemical plants or oil refineries. These stacks are in the neighborhood of 200 feet tall and are used to vent the gases that may be introduced at the inlet 2 to the atmosphere. Frequently these gases are combustible and are heavier than air so that they have to be burned at the top of the stack in order to prevent them from falling to the ground and constituting an explosion hazard. For this purpose there is provided a pilot burner or light 3 which is attached by a support 4 to the top of the stack. The burner is supplied with a combustible mixture of gas and air, or with gas that can inspirate the required air, through a pipe 5. As the burner throws a flame across the top of the stack the gases issuing therefrom will be ignited. The supply of gas or combustible

mixture through pipe 5 may be regulated by a suitable valve (not shown) that can be manually operated and which will be located adjacent to the bottom of the stack within the reach of an attendant.

This invention is concerned more particularly with the combination of the stack and the pilot burner and mechanism by means of which the pilot burner can be ignited. To this end there is provided an elongated tube 6 which is attached to the side of the stack and between the stack and the pilot burner by means of the support 4 and through supports 7, one of which is shown. The tube 6 may be made of any suitable material and is provided with a straight internal bore which is smooth enough for a piston 8 located therein to be moved through the tube. This tube can be of the type used in pneumatic systems used in department stores or it can be made of other material if desired. The piston 8 is preferably formed of some light weight material and may be provided with piston rings, if necessary, in order to maintain compression beneath it. This piston has formed on its top a holder 9 for an igniting flare 11 that can be placed therein. When in its lowermost position in the tube 6 the piston rests upon a spring 12 that is received in a recess 13 formed in the bottom of the piston. The lower end of the spring is centered by a projection 14 on a plate 15 that is suitably fastened in the tube. Plate 15 is provided with openings 16 through which air under pressure can pass to the bottom of the piston.

An opening is formed in the tube above the top of the piston in its rest position, which opening is closed by a door 17 hinged to the exterior of the tube 6 at 18. In its operating position the interior of door 17 forms a smooth inner surface for the tube and is held in this position by a suitable locking mechanism, which can include a bolt projecting from the tube and thumb screw 19 on the end of the bolt. The door is provided around its edges with a gasket 21 so that an air-tight connection will be formed between the door and the tube when the door is in its closed position.

Air under a suitably regulated pressure is supplied to the lower portion of the tube 6 under the plate 15 through a pipe 22. This pipe 22 has a three-way valve 23 in it through which compressed air can be introduced to the lower end of the tube or through which air can be exhausted from the tube. There is provided a pressure gauge 24 to indicate the pressure of the air being used.

In the operation of the device, door 17 is opened and flare 11 is placed in holder 9. This flare may desirably take the form of a railroad fuse which burns with a red light, although any other type of flare can be used, if desired. After the lighted flare has been placed in the holder the door 17 is closed and valve 23 is opened to admit compressed air to the lower portion of the tube 6. This compressed air forces the piston and the flare carried thereby to the top of the tube where it is stopped by a flange 25 that is used to prevent the piston from going out of the top of the tube. When the operator sees the flare at the top of the tube he can then open the valve in supply line 5 for the pilot burner. The flare will then ignite the pilot burner so that it will produce a flame which extends over the top of the stack as diagrammatically shown to ignite the gases being vented therethrough. After the pilot light or burner has been ignited the valve 23 can be adjusted to relieve the air pressure in the lower portion of the tube and thereby permit piston 8 to return to its normal position. Spring 12 is used to cushion the fall of the piston as it returns to the bottom of the tube. By properly manipulating valve 23 the descent of the piston can be regulated so that no substantial shock will be imparted to the mechanism.

From the above description it will be seen that the invention provides apparatus by means of which gases can be ignited at the top of a tall stack or other inaccessible place without the necessity for an attendent to climb the stack or without he danger of explosion of the gases being vented due to an accumulation thereof. It is noted that the piston 8 may be kept at the top of the stack if there is danger of dirt, rain or other foreign matter entering the top of the tubes. If the piston is kept at the top of the tube it will act as a cover

therefor so that the interior of the tube can always be kept clean and smooth.

While in accordance with the provisions of the statutes, I have illustrated and described the best form of embodiment of my invention now known to me it will be apparent to those skilled in the art that changes may be made in the form of the apparatus disclosed without departing from the spirit and scope of the invention, as set forth in the appended claims, and that in some cases certain features of my invention may be used to advantage without a corresponding use of other features.

What is claimed is:

1. In combination, a stack from which combustible gases are vented to the atmosphere, a pilot burner operative to burn a combustible mixture and to project a flame therefrom when the mixture is ignited, means to mount said burner so that its flame projects across the top of said stack to ignite the gases vented therefrom, and means to ignite the mixture issuing from said pilot burner including a flare, a carrier therefor, guide means for said carrier extending from an accessible position adjacent to the bottom of said stack to a position adjacent to said burner, and means to move said carrier along said guide means.

2. A device for igniting gases issuing from a stack including in combination a stack, a pilot burner operative to burn a combustible mixture as a pilot flame projecting therefrom, means to mount said pilot burner so that its flame projects across the top of said stack, a tube having an open end, means to mount said tube vertically beside said stack with the open end adjacent to said pilot burner, a flare to ignite said pilot burner, and means located in said tube upon which said flare is mounted to move said flare from a position in the lower portion thereof to the top of the same.

3. A device for igniting gases issuing from a stack including in combination a stack, a pilot burner, means to mount said burner on said stack so that the flame from the burner will project across the exit of the stack, and means to ignite a combustible mixture issuing from said burner including an elongated tube having an open end, means to mount said tube with the open end thereof adjacent to said burner, a piston in said tube, a flare carried by said piston so that when the piston is at the open end of said tube the flare can ignite the burner, and means to admit a fluid under pressure to said tube under said piston so that the piston may be moved to open end of said tube.

4. The combination of claim 3 in which means is provided to stop movement of said piston when it reaches the open end of said tube, and means to cushion said piston when it returns to its original position upon release of the fluid pressure in the tube under it.

5. A device for igniting gases including a pilot burner, means to mount said pilot burner adjacent to the point at which said gases issue where its flame can ignite the gases, a tube having an open end extending from a first location at a point remote from said pilot burner to a second location higher than the first where its open end is adjacent to said pilot burner, said tube being provided with an opening adjacent to its lower end, a piston normally stationed in said tube immediately below said opening, an igniting device for said pilot burner to be moved through said opening and placed on said piston, means to close tightly said opening, and means to admit a fluid under pressure in said tube below said piston to raise the latter to the top of said tube where said igniting device may extend out of the open end thereof to ignite said pilot burner.

6. The combination of claim 5 including means at the top of said tube to stop said piston when it reaches said open end, and means located in the lower end of said tube to cushion the fall of said piston as it returns to the position at which it is normally stationed.

7. A device for moving a flame from a first location adjacent the bottom of a tall stack to a second location above the first and adjacent to the top thereof including a tube extending from said first location to said second location, said tube having an open upper end, a piston freely slidable in said tube, a flare operative to burn with a flame mounted on said piston, said tube being provided with an opening through which the flare can be placed on said piston, closure means for said opening, means to supply fluid under pressure to said tube under said piston to move the piston to the top thereof where the flame of said flare may project out of the top of said tube, and means at the top of said tube to stop said piston.

8. In apparatus of the class described, the combination of a burner located in a fixed position, a tube having an open end adjacent to said burner and a closed end extending away from the same so that the closed end of said tube is at a location remote from said fixed position, a piston freely slidable in said tube and having means thereon to hold a burner igniting device, and means to supply a fluid under pressure directly to said tube at its closed end and behind said piston to force said piston toward the open end thereof.

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