

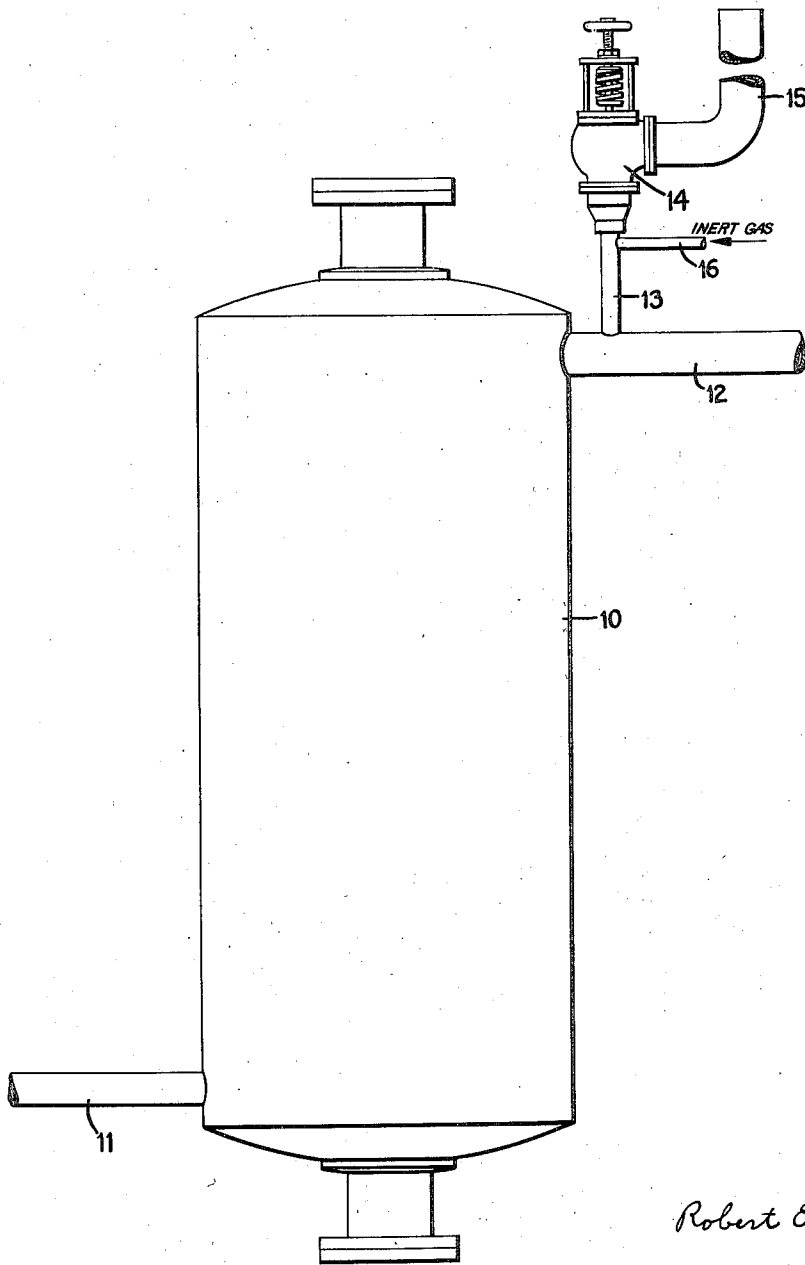
Dec. 15, 1936.

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2,064,708

METHOD FOR CRACKING HYDROCARBON OILS

Filed June 30, 1934



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UNITED STATES PATENT OFFICE

2,064,708

METHOD FOR CRACKING HYDROCARBON OILS

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Application June 30, 1934, Serial No. 733,227

3 Claims. (Cl. 196—47)

This invention relates to the art of cracking hydrocarbon oils and pertains more particularly to a method and apparatus for preventing coke and solid deposits from building up and clogging normally inactive stand pipes, such as safety valve risers, steam connections et cetera forming a part of oil cracking equipment.

For example the invention is of advantage in maintaining pipe connections, leading from the oil cracking equipment to safety valves or other safety and control instruments, free from coke deposits which normally tend to build up within the connections and prevent effective operation of the instruments. The invention will likewise find advantage in other parts of oil refining equipment which form pockets or so-called "dead ends" in which coke deposition tends to take place, ultimately blocking a passage which may later be needed.

A specific example where my invention is particularly useful is in the top of a soaking drum in which vapor phase cracking is taking place. This results in the formation of vesicular droplets of tar, which tend to coke rapidly when they come in contact with any solid surface. The line connecting the reaction chamber to the safety valve is naturally somewhat cooler than the products in the drum, and apparently the heaviest portion of the vapors in the line tends to condense out along with the vesicular tar and run down the walls of the tube toward the reaction chamber, being replaced with fresh incoming vapors. As the condensate approaches the reaction chamber its temperature is raised, the lighter portion is driven off, and the remainder tends to coke in the vicinity of the outlet, sometimes forming large "icicles" of coke and almost completely blocking the entrance to the safety valve, thus creating a very hazardous situation. Somewhat similar phenomena apparently occur in other types of cracking operations also.

Other and more specific advantages of the invention will be apparent from the more detailed description hereinafter.

For a clearer understanding of the invention reference is now made to the accompanying drawing which is an elevational view showing the invention in connection with safety valves for a reaction chamber employed in the oil cracking operation.

In the drawing the reference character 10 denotes a reaction chamber of conventional design and adapted to be maintained under elevated pressure and temperature during the cracking operation. As illustrated the reaction chamber

10 is provided with conduit 11 located adjacent the bottom thereof for introducing into the chamber for further treatment the hydrocarbons undergoing cracking. The chamber 10 is further provided with an outlet conduit 12 for withdrawing products therefrom.

As shown the outlet conduit 12 is provided with riser pipe 13 leading to safety valve 14. This valve is of suitable conventional structure which may be adjusted to open at predetermined pressures above the normal operating pressure to prevent destructive stresses being developed in the equipment. The safety valve 14 is provided with the usual vent pipe 15 for exhausting the products to a point remote from the reaction chamber in event the safety valve is forced open.

In the normal operation of the equipment the riser 13 leading to the safety valve, as hereinbefore described, normally forms a pocket containing hydrocarbon material which decomposes to form coke which, if permitted to build up, eventually clogs the pipe and prevents effective operation of the safety valve.

In accordance with the present invention I avoid this difficulty by introducing into the top of the riser pipe 13 by means of pipe connection 16 a relatively inert gas, such as light gaseous hydrocarbons, heavy naphtha or steam, under a pressure somewhat higher than that normally maintained within the vapor conduits during the cracking operation. I prefer to continuously introduce a small amount of such inert gas so as to cause a continuous downflow of the gas within the riser 13 and thus continuously flush the riser with the gas and prevent coke-forming hydrocarbon vapors and droplets of incipient coke from rising and condensing therein.

While the invention has been illustrated in connection with a stand pipe or riser for safety valves it will be apparent that it is also applicable to other parts of oil refining equipment having free communication with hot vapors maintained at cracking temperature and which parts form vapor pockets or so-called "dead ends" in which coke-forming hydrocarbon vapors tend to collect and deposit coke-generating tars.

While the preferred embodiment has been described for purpose of illustration, it is understood that the invention embraces such other modifications or variations which come within the scope and spirit thereof and that the invention is not intended to be limited except as necessary to distinguish from prior art.

I claim:

1. A method of maintaining a pipe connection,

leading from oil cracking equipment to a safety valve, relatively free of coke-forming hydrocarbon vapors, which comprises introducing into said pipe adjacent said safety valve a non-coke-forming gas and flowing said inert gas through said pipe connection in a direction away from said safety valve during the cracking operation.

2. In the process of cracking hydrocarbon oil wherein hydrocarbon vapors are maintained at a relatively high cracking temperature in an enlarged chamber and wherein the chamber is provided with an emergency, normally inactive pipe connection leading therefrom; a method of maintaining said emergency pipe connection relatively free of coke deposit which comprises introducing

into said connection at a point removed from said enlarged chamber a non-coke-forming gas and flowing said gas through said connection from the point of entry thereof to said enlarged chamber during the oil cracking treatment.

3. A method of maintaining a pipe connection leading from oil-cracking equipment and having one end closed and the opposite end in open communication with hydrocarbon vapors at cracking temperature free of coke-forming vapors which comprises filling said connection with a non coke-forming gas and maintaining said connection completely filled with said gas during the cracking operation.

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