

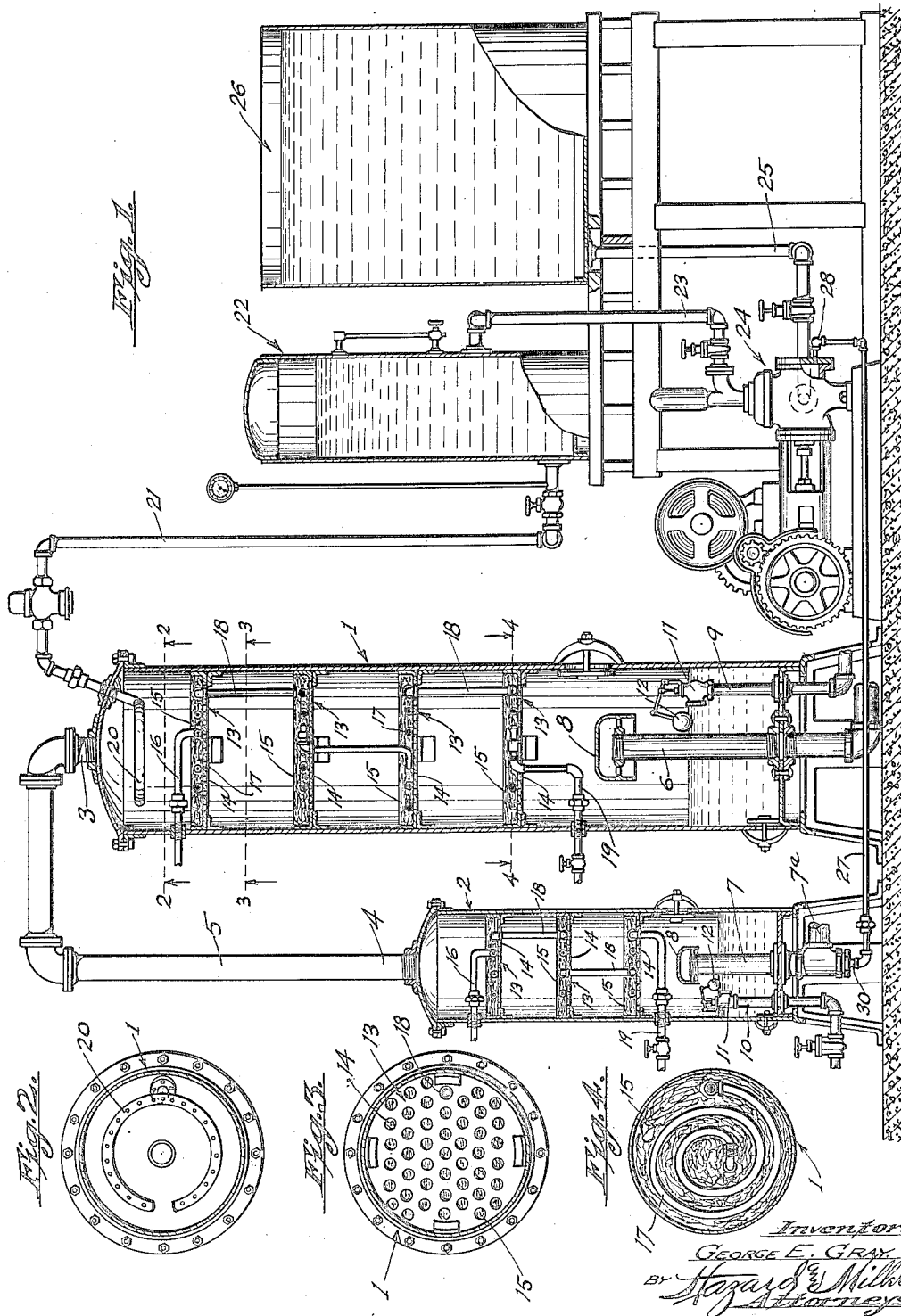
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APPARATUS AND PROCESS FOR CONDENSING CASING HEAD GAS AND THE LIKE

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UNITED STATES PATENT OFFICE.

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APPARATUS AND PROCESS FOR CONDENSING CASING-HEAD GAS AND THE LIKE.

Application filed October 28, 1920. Serial No. 420,259.

To all whom it may concern:

Be it known that I, GEORGE E. GRAY, a citizen of the United States, residing at Compton, in the county of Los Angeles and State of California, have invented new and useful Improvements in Apparatus and Processes for Condensing Casing-Head Gas and the like, of which the following is a specification.

This invention relates to the condensing of casing head gas and the like, and has for its object the provision of means whereby the gas is condensed by passing the same through a finely divided metallic substance such as metallic wool.

The invention also contemplates the saturating of the gas with a heavy hydrocarbon and then passing the same through the metallic wool in order that the heavy hydrocarbon may combine with the gas so as to more readily accomplish the condensing of the gas.

The invention will be readily understood from the following description of the accompanying drawings, in which;

Figure 1 is a vertical section through an apparatus constructed in accordance with the invention.

Figs. 2, 3 and 4 are transverse sections on the lines 2—2, 3—3 and 4—4 of Fig. 1.

In the drawings I have shown the cylindrical tank 1 and a smaller cylindrical tank 2 alongside the same. Ports 3 and 4 are arranged in the top of tanks 1 and 2 and are connected by a pipe 5. Stand pipes 6 and 7 extend upwardly within tanks 1 and 2 and are provided with baffles 8 over the ends of the same for preventing fluid flowing into said stand pipes. Discharge pipes 9 and 10 are arranged in the respective tanks and are provided with cut off valves 11 controlled by floats 12 so as to open and permit the discharge of liquid from the tanks when the liquid reaches a predetermined level.

Transverse partitions 13 are arranged in each of the tanks above stand pipes 6 and 7 and these partitions are perforated as shown at 14 to permit the flow of gases and liquid through the same. A suitable finely divided metallic substance, which will not absorb the gases supplied to the tanks such as metallic wool represented at 15, is placed upon each of the partitions 13. A condensing coil is, preferably, also arranged on the partitions. Each of these condensing coils is shown as comprising the pipe 16 extend-

ing inwardly through the wall of the cylinder and then arranged as a coil 17 upon each of the partitions 13 and surrounded by the metallic wool with pipe sections 18 connecting each of the coils. The lowermost coil is connected to an outlet pipe 19, and a flow of cooling fluid, such as water, is maintained through the conduit as thus arranged by connecting inlet and discharge pipes 16—19 to a suitable water reservoir provided with suitable means for maintaining circulation of the water.

One of the tanks, shown as the larger tank 1, is provided with means whereby a fluid may be discharged into the tank for saturating the gases in the same. As an instance of this arrangement a spray head 20 is arranged in the top of tank 1 and is connected by a pipe 21 to a pressure reservoir 22. This reservoir is in turn connected by a pipe 23 to the discharge port of a suitable pump 24. The pump is supplied through pipe 25 from a tank 26.

A by-pass 27, preferably, connects the stand pipe 7 and the pump cylinder, said by-pass being provided with a check valve 28 arranged to prevent back pressure through the same to the stand pipe. The by-pass is, preferably, connected to the stand pipe below its supply pipe 7^a in order to form a trap 30.

In operation a suitable heavy hydrocarbon such as kerosene is supplied to tank 26, and either stand pipe 6 or stand pipe 7 is connected to the source of supply of the gases to be condensed, while the other of said stand pipes is connected to suitable discharge means for the gaseous residue remaining after the condensation of the gases of the heavy hydrocarbon. In practice, when condensing casing head gas the apparatus will be found to operate more efficiently if the supply pipe 7^a of stand pipe 7 is connected to the well casing so that the gas to be condensed will first flow through tank 2 and thence into tank 1. In this arrangement the pipe leading to stand pipe 6 is connected to suitable receiving means for the gaseous residue of the process. The gas supplied through the stand pipe 7 will rise in tank 2 and thus pass through the metallic wool 15. The intimate contact between the gases and the metallic wool, which is at a lower temperature will cool the gases and cause condensation of the same. The provision of the cooling coils 17 will assist in

the cooling of the gases. The liquid of condensation will flow to the bottom of the tank, and when a sufficient amount has accumulated will be discharged through pipe 10 to a suitable receptacle.

The gas which reaches the top of tank 2 without having been condensed will flow through pipe 5 into tank 1. At this point heavy hydrocarbon from tank 26 will be discharged through spray head 20 so as to saturate the gas, and the saturated gas flowing downwardly through tank 1 will be condensed by the action of the cooling coils and metallic wool upon the partitions of this tank. The liquid of condensation flowing to the bottom of tank 1 will be collected through pipe 9 when a sufficient amount has accumulated to open valve 11. The non-condensable portions of the casing head gas will be discharged through stand pipe 6.

It will be noted that the action of pump 24 will draw a small amount of the gas entering stand pipe 7 through by-pass 27 into the pump and will force the same with the heavy hydrocarbon 26 into the pressure reservoir 22. The action of this gas at the top of the pressure reservoir will form a cushion within the same, and any portion of said gas which is condensed will flow with the heavy hydrocarbon through pipe 21 to the spray head 20 where it will be returned to tank 1.

Various changes may be made without departing from the spirit of the invention as claimed.

What is claimed is:

1. A condenser comprising a plurality of receptacles having a gas conduit connecting them at the top, additional conduits communicating with the respective receptacles, one of said additional conduits forming a gas inlet and the other of said additional conduits forming a discharge for uncondensed gases, finely divided, non-absorbent metallic contact substance arranged in layers within said receptacles, drains leading from the respective receptacles, and a supply pipe extending into the top of one of said receptacles and provided with a spray device.
2. A condenser for gases comprising a receptacle having a gas inlet, a gas outlet, a drain for the condensed gases, supply means leading into said receptacle, means for pumping fluid through said supply means,

and means for drawing a portion of the gas supply to said receptacle into said supply means.

3. A condenser for gases comprising a receptacle having a gas inlet, a gas discharge, a drain for the condensed gases, a supply pipe leading into said receptacle, a reservoir connected to said pipe, means for pumping fluid into said reservoir and said pipe, and means for drawing a portion of the gas supply to said receptacle into said reservoir to form a cushion.

4. The process of condensing hydrocarbon gases which consists of introducing the gas into a receptacle provided with cooled layers of finely divided, metallic, contact substance, said layers being continuously cooled by the passing of a circulating cooling liquid therethrough, subjecting the gases to the action of said substance by passing them through the layers, draining away the condensed gases from the receptacle, and leading off the uncondensed gases from the top of the receptacle into a second receptacle, subjecting the gases therein to action of finely divided, metallic, contact substance and at the same time spraying a liquid hydrocarbon into the second receptacle and carrying off the condensed and uncondensed gases separately.

5. The process of condensing hydrocarbon gases which consists of introducing the gas into a receptacle provided with cooled layers of finely divided, metallic, contact substance, said layers being continuously cooled by the passing of a circulating cooling liquid therethrough, subjecting the gases to the action of said substance by passing them through the layers, draining away the condensed gases from the receptacle, and leading off the uncondensed gases from the top of the receptacle into a second receptacle, subjecting the gases therein to action of finely divided, metallic, contact substance and at the same time spraying a liquid hydrocarbon into the second receptacle and carrying off the condensed and uncondensed products separately and establishing a pressure of the gas, to be treated, upon the hydrocarbon before it is sprayed into the second receptacle.

In testimony whereof I have signed my name to this specification.

GEORGE E. GRAY.