HEAT GENERATING CARTRIDGE

Filed April 2, 1923

Inventor
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HEAT-GENERATING CARTRIDGE.

To all whom it may concern:

Be it known that I, Henry J. Haber, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Heat-Generating Cartridges, of which the following is a full, clear, and exact description.

The invention relates to a heat generating cartridge for use in reestablishing the flow of oil wells in which the flow of oil has become obstructed by deposits of paraffin in the oil bearing sands surrounding the bottom portion of the well.

The present invention is an improvement over the heat generating cartridge disclosed in my co-pending application for a method and apparatus for clearing oil wells, Serial No. 575,818, filed July 15, 1922.

It is an object of the present invention to provide a heat generating cartridge which can be lowered through a considerable depth of oil into the water at the bottom of the well without permitting oil to become mixed with the chemicals within the cartridge prior to the entry of water thereto.

A further object is to provide a cartridge having an enclosing wall formed of material which will upon addition of water to the materials contained therein react exothermically with said materials, the wall being formed to provide an irregular surface contacting with the chemicals so that there is a larger surface subjected to chemical action whereby the rate of reaction will be increased.

A further object is to provide a cartridge which will withstand rough usage and will not be damaged or rendered ineffective by the handling thereof incident to shipping and storing.

Other objects will be apparent from the following description and accompanying drawings.

The following description and accompanying drawings set forth in detail certain means embodying the invention, the disclosed means, however, constituting but one of the various mechanical forms in which the principle of the invention may be employed.

Reference should be had to the accompanying drawings forming a part of this specification in which Fig. 1 is a side elevation of the cartridge partially broken away to show parts thereof in section; Fig. 2 is a section on line 2—2 of Fig. 1; Fig. 3 is a diagrammatic sectional view showing the lower portion of an oil well.

Referring to the accompanying drawings, the cartridge has an outer cylindrical enclosing member or container 1 formed of sheet metal preferably aluminum. The container 1 has upper and lower heads 2 and 3 which are provided with central openings. The opening in the lower head is provided with a removable closure member 4 and the opening 5 in the upper head 2 is preferably provided with a similar closure member to protect the contents of the container during shipment and during the handling thereof prior to actual use. Within the cylindrical container 1 is an inner cylinder 6 formed of aluminum and extending substantially the full length of the cylinder 1. The inner cylinder 6 is filled with materials which upon addition of water will react exothermically with the aluminum of the cylinder to generate intense heat for melting down the paraffin deposits surrounding the lower portion of an oil well. The material with which the cylinder 6 is filled is preferably a mixture of a hydrate of an alkali metal and aluminum in a finely divided form such as powder or filings, and has an opening 13 in the top thereof which permits the ball to be filled with water before the cartridge is lowered into the well.
into the well. The inner cylinder 6 is of somewhat smaller diameter than the outer cylinder 1 so that an annular chamber 14 is provided between the cylinder 6 and the outer cylinder 1. In using the cartridge the end closure members are first removed and the annular chamber 14, together with the hollow ball 10 at the upper end of the cylinder are filled with water. The cartridge is then lowered into the well to the bottom thereof where more water will enter through the opening in the lower head 3 and the papier mâché balls 10 and 11 which have already been softened by the water already in the cartridge, will soon be rendered ineffective and permit the water to flow freely into the material packed within the cylinder 6. The addition of water to the material within the cylinder causes a chemical reaction between the materials contained in the cylinder and between this material and the material of the wall of the cylinder, the reaction causing intense heat to be generated and gradually destroying the cartridge. The heat so generated is sufficient to melt down paraffin deposits for a considerable distance on all sides of the well so that a free flow of oil will be reestablished. There is usually a considerable body of oil above the water at the bottom of the well and the cartridge must be lowered through this layer of oil before it reaches the water. It is essential that the oil be prevented from entering the chemicals within the cylinder since the pressure of oil would materially impede the reaction upon the subsequent entry of water into the chemicals.

I have provided against the entry of oil into the interior of the cylinder by filling the space surrounding the inner cylinder and the space within the body of the cylinder 6 around the ball 11 with water prior to the lowering of the cartridge into the well. The balls 10 and 11 will prevent the passage of water into the space between the two balls for a sufficient length of time to enable the cartridge to be lowered through the layer of oil in the well into the body of water at the bottom thereof. The gradual softening of the papier mâché balls 10 and 11 due to the action of water within the cylinder will, however, shortly after the cylinder has reached the bottom of the well render the balls ineffective and permit entry of water to the chemicals packed within the cylinder 6.

Having described my invention, I claim:

1. A heat generating cartridge comprising a tubular container having an opening in the lower end thereof, an open ended tube within the container and spaced from the wall thereof, said tube containing substances which react exothermically upon addition of water, a closure member for the lower end of the inner tube adapted to be rendered ineffective by water whereby after said cartridge is lowered into a body of water, water is admitted to the interior of the inner tube.

2. A heat generating cartridge comprising a cylindrical container having an opening in the lower end thereof for admission of water, an open ended inner cylinder containing a substance which upon addition of water reacts exothermically with the material of the inner cylinder, the cylindrical wall of the inner cylinder being spaced from the wall of the container and forming therewith an annular chamber adapted to be filled with water, a hollow papier mâché ball closing the lower end of the inner cylinder, said ball being filled with substances which upon addition of water react exothermically.

3. A heat generating cartridge comprising a cylindrical container having an opening in the lower end thereof for admission of water, an open ended inner cylinder containing substances which upon addition of water react exothermically, the cylindrical wall of the inner cylinder being spaced from the wall of the container and forming therewith an annular chamber, hollow papier mâché balls closing the open ends of the inner cylinder, the ball at the lower end containing substances which upon addition of water react exothermically.

4. A heat generating cartridge comprising an outer cylindrical container having an opening in its lower end through which water may enter, an inner aluminum cylinder of smaller diameter within the container and forming therewith an outer annular chamber and closure members for the ends of the inner cylinder which are gradually rendered ineffective by the action of water, said aluminum cylinder being filled with material the principal constituent of which is a hydrate of an alkali metal.

5. A heat generating cartridge comprising an aluminum cylinder filled with material containing a hydrate of an alkali metal and a closure member for the lower end of the cylinder which is adapted to be gradually rendered ineffective by the action of water.

6. A heat generating cartridge comprising a hollow open ended aluminum cylinder formed with indentations filled with a mixture containing a hydrate of an alkali metal, and closure members for the ends of said cylinder adapted to be gradually rendered ineffective by the action of water.

7. A heat generating cartridge comprising a hollow open ended corrugated aluminum cylinder filled with a mixture containing a hydrate of an alkali metal and a catalytic agent, and papier mâché balls forming plugs for the ends of said cylinder.

8. A heat generating cartridge compris-
ing a corrugated cylinder formed of aluminum in sheet form, said cylinder being filled with a mixture containing a hydrate of an alkali metal, aluminum in finely divided form and a catalytic agent, hollow papier mâché balls forming plugs for the ends of the cylinder the lower ball being filled with a mixture similar to that with which the cylinder is filled.

9. A heat generating cartridge comprising an outer casing having a cylindrical body and end heads, said heads having openings with detachable closure members, an inner corrugated aluminum cylinder of less diameter than the wall of the outer cylinder and forming therewith an annular chamber adapted to be filled with water, and hollow papier mâché balls forming plugs at the ends of the aluminum cylinder, said inner cylinder and the lower ball being filled with a mixture containing a hydrate of an alkali metal and aluminum in a finely divided form.

In testimony whereof, I hereunto affix my signature.  
HENRY JOHN HABER.