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PROCESS FOR BURNING OIL INSOLUBLE SLUDGE

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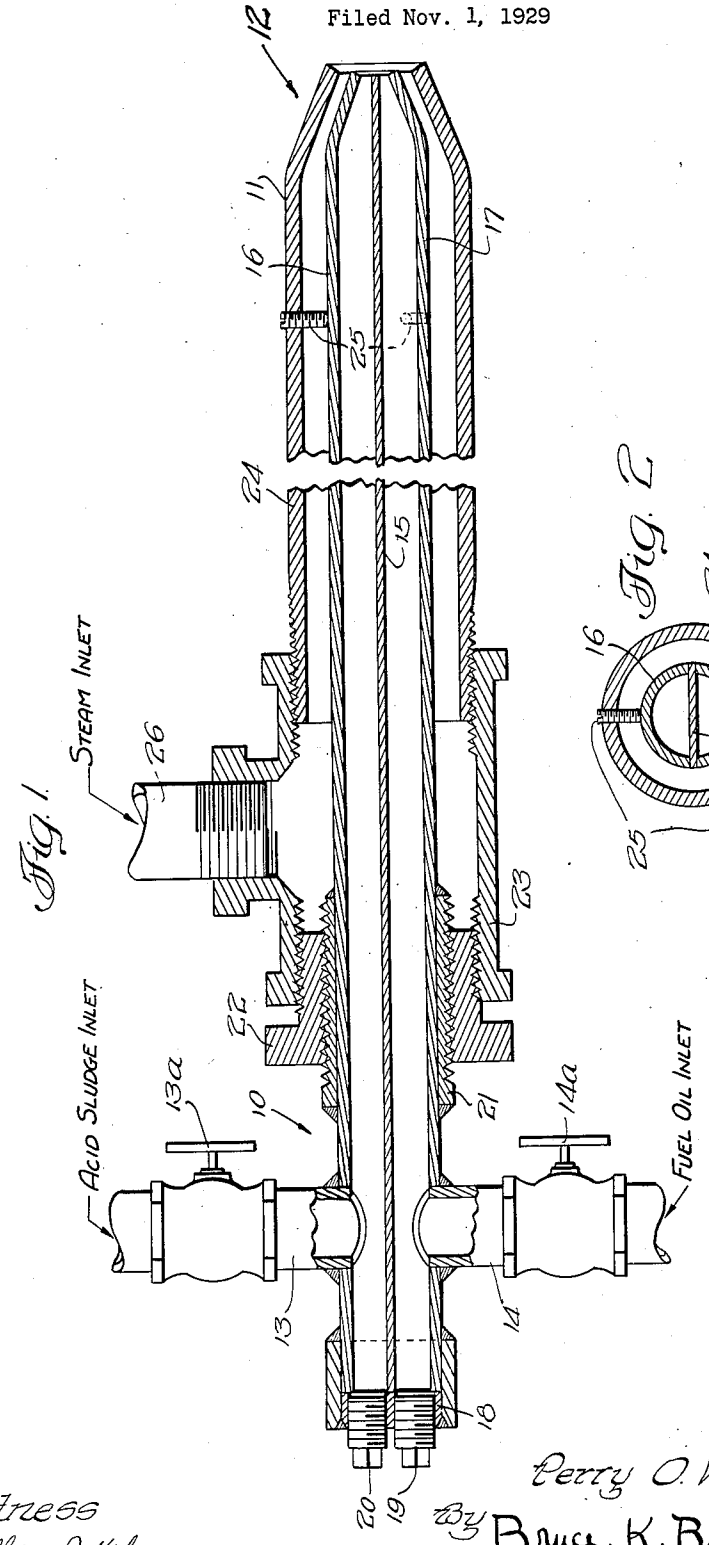


Fig. 1.

Fig. 2

Witness
William P. Kilroy

Inventor
Perry O. Vandeveer
By Bruce K. Brown. Atty.

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PROCESS FOR BURNING OIL INSOLUBLE SLUDGE

Perry O. Vandeveer, Whiting, Ind., assignor to Standard Oil Company, Chicago, Ill., a corporation of Indiana

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3 Claims. (Cl. 158—117.5)

This invention relates to a process for utilizing waste and/or obnoxious by-products from the refining and treating of mineral oils and it pertains more particularly to a method for burning acid sludge and other oil bearing materials which cannot be burned by ordinary methods.

The object of my invention is to provide a method and means of utilizing the fuel value of oleum liver, acid sludges, and similar refinery by-products. Oleum liver has a composition of about 30 to 40% sulfonic and sulfuric acids, 10 to 20% oil, and the rest water. Since it is practically impossible to burn this mixture, attempts have been made to mix it with burning oils. The oleum liver soon separates out of such a mixture. Of course, the mixture could be maintained by agitation but the expense of this procedure is prohibitive. The attempt to spray the sludge against a hot brick wall in a furnace and thereby effect a complete combustion proved unsatisfactory. The object of my invention is to accomplish results which have been hitherto believed impossible, to wit: the complete economical utilization of the heat value of these waste by-products.

My invention may be briefly characterized as a process wherein fuel oil is intimately mixed with acid sludge at the point where the oil and sludge enter a furnace. As the mixture enters the furnace, I atomize it with steam and I have found that the fuel oil will initiate combustion and completely burn the acid sludge. As soon as the temperature in the furnace is sufficiently elevated I may reduce the amount of fuel oil and finally I may maintain combustion by the introduction of sludge alone, atomized, of course, with steam.

My invention will be better understood from the following description of a preferred embodiment which is illustrated in the accompanying drawing, wherein:

Figure 1 is a horizontal section of the nozzles and the atomizer and

Figure 2 is a transverse section taken through the nozzle end adjusting screws.

The apparatus used in conjunction with my invention is relatively simple and may be briefly described as a partitioned pipe 10 surrounded by a steam jacket 11 terminating in an atomizing nozzle 12. The steam jacket serves the double function of maintaining the acid sludge at a high temperature (low viscosity) and supplying the means for atomizing the mixture.

The acid sludge inlet pipe 13 is brazed to one side of partitioned pipe 10 and the fuel oil inlet pipe 14 is brazed to the other side of this pipe 10.

The partitioned pipe 10 may be of brass of about ¾" diameter and may have a flat rectangular strip 15 brazed at its center to divide the pipe into two sections 16 and 17 respectively. The pipe 10 is preferably closed at the end opposite the nozzle by a suitable end plate 18, which is provided with threaded plugs 19 and 20 which may be removed for cleaning out the nozzle when it becomes clogged.

A threaded sleeve 21 surrounds pipe 10 and carries threaded collar 22 which engages one end of steam inlet T 23. The opposite end of T 23 engages the steam casing 24 which is centered around pipe 10 by set screws 25. The opening between the tapered casing 24 and the tapered end of pipe 10 is regulated by means of spacing collar 22 which is movable backwards and forwards on sleeve 21. Steam is supplied to the T 23 through pipe 26.

By employing a partitioned pipe to provide conduits for sludge and oil, I simplify the connections to the supply lines for these liquids. I also avoid the use of a conduit of attentuated cross section resulting from the disposal of one pipe within another. This is a distinct advantage in preventing clogging by the heavy sludge and fuel oil. Both conduits are directly subjected to the heating action of the surrounding steam, likewise assisting in preventing clogging of the burner. Both oil and sludge are subjected to the same atomizing action. I employ the word "adjacent" to describe the lateral arrangement of the oil and sludge conduits of my burner to distinguish from the circumjacent arrangement resulting from the placing of one pipe within another.

Practically all petroleum oils contain large amounts of unsaturated hydrocarbons which form tar-like materials upon being treated with acid and which must be removed before the oils can be used commercially. The oils are therefore treated by mixing them with concentrated and/or fuming sulfuric acid. The details of this treatment are well known in the petroleum industry and since they form no part of my present invention they will not be described in detail.

After treatment a dirty sludge separates out at the bottom of the oil and it is this acid sludge, which has an oil content of from 10 to 20%, which I use in my invention. However, it is understood that I do not limit myself to any particular by-product and my invention is applicable to any oil bearing material which cannot be otherwise burned.

Equal portions of acid sludge and fuel oil are admitted through pipes 13 and 14 to portions 16

and 17 of pipe 10. Simultaneously steam is admitted through pipe 26 and it passes around pipe 10 in casing 24. The position of the casing is such that the steam leaving the nozzle completely atomizes the mixture of fuel oil and sludge. When this atomized mixture is ignited it will burn readily. As the temperature of the furnace increases valves 13A and 14A are regulated to decrease the amount of fuel oil and increase the amount of acid sludge. Finally the furnace may be heated entirely by the use of acid sludge.

By the relatively simple expedients above described I am enabled to supply substantially all of the heat required for a petroleum refinery by utilizing by-products which have hitherto been considered worthless as far as fuel value was concerned.

While I have described a preferred embodiment of my invention it is understood that I am not limited to the details therein set forth except as defined by the following claims:

I claim:

1. The process of burning oil insoluble acid sludge obtained from the refining of oils with acid which consists of injecting a stream of acid sludge and a stream of fuel oil into a combustion chamber, and in simultaneously atomizing and intermingling the sludge and oil to form a combustible mixture.

2. The process of burning oil insoluble acid sludge obtained from the refining of oils with acid which consists of conducting a stream of acid sludge and a stream of fuel oil to a combustion chamber and in subjecting the two streams simultaneously to the influence of a propellant and atomizing fluid to cause the atomization and thorough commingling of the sludge and atomized oil to form a combustible mixture.

3. The process of burning oil insoluble acid sludge obtained from the refining of oils with acid which consists of forming a mixture of atomized fuel oil and finely divided sludge thoroughly commingled therewith, igniting the mixture so formed and in subsequently reducing the quantity of fuel oil making up the mixture.

PERRY O. VANDEVEER.