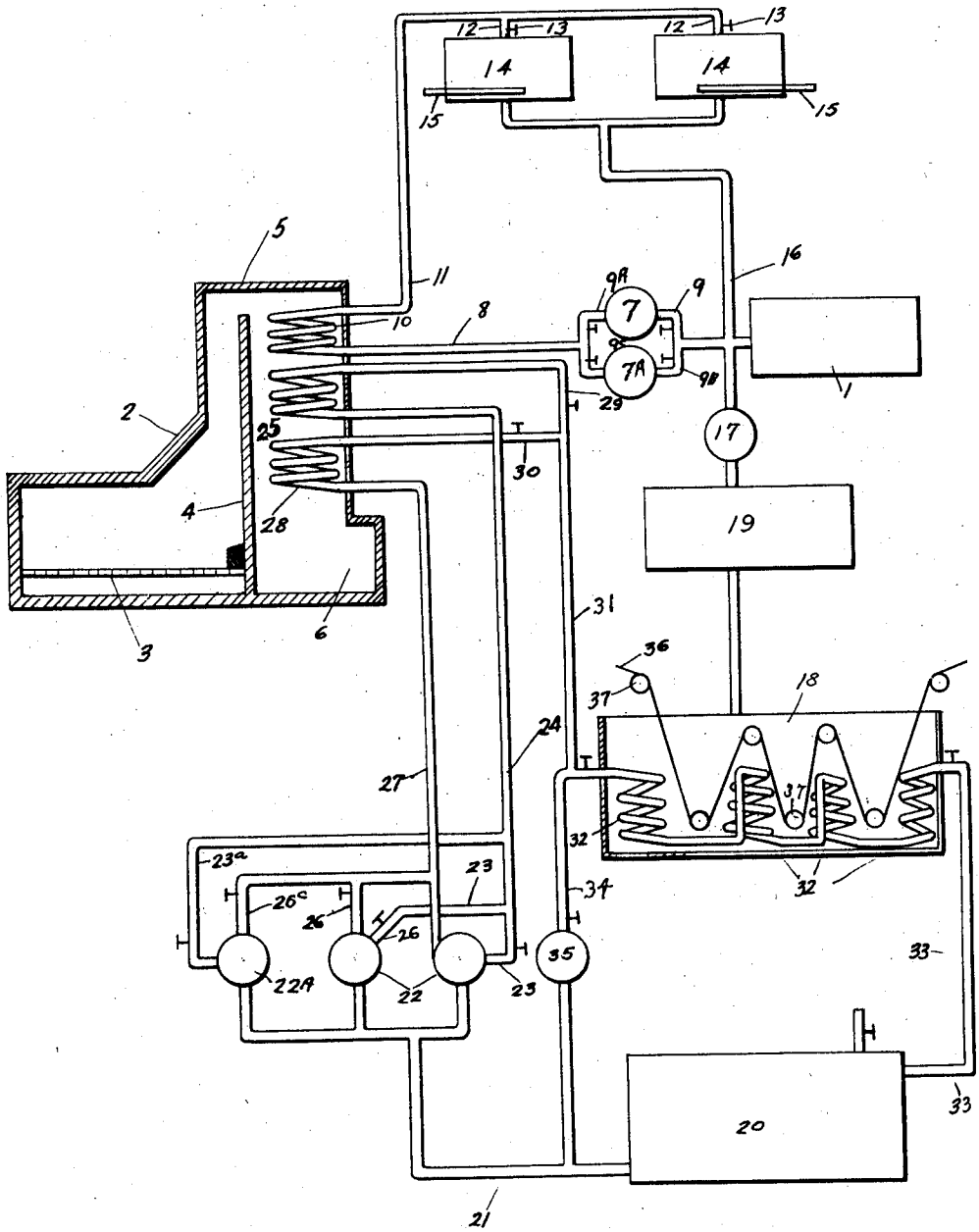
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PREPARATION OF SATURANTS

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## PREPARATION OF SATURANTS.

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This invention is for a process and apparatus for preparing materials so that they can be more readily utilized for desired purposes. The invention relates especially to preparing materials which may for example, be of a bituminous nature so that they are more suitable for the intended uses. One of the particular uses of the invention is for the preparation of asphalt obtained as a residue from petroleum oils so that it may be used as a saturant for roofing papers, though the invention is not restricted to this particular use.

One of the objects of the invention is to treat liquid materials so as to impart thereto the correct degree of fluidity. Another object is to maintain the liquid at a suitable temperature while it is being used. Another object is to subject the liquid to a heat treatment and then utilize some of the waste heat for maintaining the desired temperature. Another object is to provide a heat transferring medium between the source of heat and the liquid that is being utilized. Another object is to provide a suitable material that may be used as a saturant for waterproofing materials and at the same time to keep it in condition so that it can be readily utilized for its intended purpose. Other objects and advantages of the invention will be obvious as the description proceeds.

The invention will be understood from the description in connection with the accompanying drawing which shows somewhat diagrammatically an arrangement of apparatus with which the invention can be practiced.

In the drawing, reference character 1 indicates a storage tank for asphalt saturant or flux oil which are derived from petroleum crudes. A heater 2 provided with a fire box 3 and a baffle wall 4 is provided so that the hot gases or products of combustion pass from the upper portion 5 to the lower portion 6 and thence out into a stack or chimney (not shown). Different sorts of fire boxes may be used suitable for different sorts of fuel. The one shown in the drawing is suitable for liquid fuel. Only one baffle wall is necessary but there may be more if desired in the construction of the furnace.

A pump 7 is interposed in the pipe 8 which has a valve 9, this pipe leading from the tank 1 to heating device 10 located in the upper or hottest part of the heater 2. For safe continuous operation it is desired that two pumps 7 and $7^A$ be interposed in the pipe line 8 which has valves 9, $9^A$, $9^B$ and $9^C$. Only one pump at a time is used and the valves are manipulated so that the flow is from storage tank through pump 7 or $7^A$ to the heating device 10. The flow of liquid in the heating device should be counter current to the hot gases for high efficiency but it is not necessary as the flow in the heating device may be in the same direction as the hot gases. A pipe 11 leads from the heating device 10 through the pipes 12, which are provided with valves 13, to the stills 14 which are provided with means 15 for blowing air through material in the stills 14. It is well known that flux oil may be blown with air at the proper temperature in order to oxidize it into an asphalt having the proper viscosity. Generally speaking, the greater the oxidation accomplished the higher the melting point of the asphalt produced. What is ordinarily termed an asphalt saturant may, therefore, be oxidized further so as to increase its melting point, thereby making it a more suitable saturant or, in fact, making it suitable for coating purposes. A pipe 16 leads from the stills 14 through a pump 17 into the saturating tank 18. A supply tank 19 which may be heat insulated or not may be interposed between the pump 17 and the saturating tank 18. After the material has been oxidized to a sufficient extent in stills 14, it is pumped by means of the pump 17 into the saturating tank 18 or to the supply tank 19 which should be at an elevation above the saturating tank 18 in order that material will flow from it to the saturating tank by gravity. Reference character 20 indicates a storage tank for a high boiling liquid hydrocarbon, petroleum oil, or coal tar oil preferably having a boiling point somewhat above that of water so as to have sufficient heat absorbing capacity below its boiling point to serve the purpose hereinafter set forth. A pipe 21 leads from this tank through pumps 22 from whence the material may be pumped through the valved pipes 23 and 24 to the heating device 25 located near the middle portion of the heater 2 or through valved pipes 26 and 27 to the heating device 28 located in the lowest or coolest part of the heater 2. The high boiling liquid hydro-

carbon, petroleum oil or coal tar oil is pumped through both heating devices 25 and 28 during the operation of the unit. A pump 22A may be provided as an emergency pump in case one of the other pumps breaks down. Valved pipes are so arranged that the high boiling liquid hydrocarbon, petroleum oil or coal tar oil can be pumped by pump 22A either to the heating device 25 or 28. The valved pipes 29 and 30 lead from the heating devices 25 and 28 through the pipe 31 to the heating coils 32 in the tank 18. Instead of having heating coils 32 in tank 18 this tank may be surrounded by a jacket into which the heating oil may be introduced from pipe 31. A valved pipe 33 leads from the heating coils 32 or jacket surrounding the tank 18 to the supply tank 20. A valved pipe 34 leads through the pump 35 to the pipe 21 from pipe 31.

The operation is as follows: A saturating material such as asphalt saturant or flux oil is placed in tank 1 and from thence pumped through the heating device 10 while the heater 2 is hot so that this raises the temperature to about 425–475° F., when it is then passed to the stills 14 and air is blown therethrough. It has been found that when the temperature has been increased sufficiently by means of the heating devices 10 that the asphalt saturant or flux oil (as the case may be) may be oxidized by blowing air therethrough into the tanks 14 without supplying additional heat as the chemical reactions taking place are sufficient to maintain the temperature until the material has been oxidized to the desired extent. After it has been so oxidized it is pumped by means of the pump 17 into the saturating tank 18.

The liquid hydrocarbon, petroleum oil, or coal tar oil in tank 20 is pumped by means of the pumps 22 through the heating devices 25 and 28 and thence through the heating coils 32 which are in tank 18 between the loops of sheet 36 of material to be saturated. In this way heat is given up to the material in the tank 18 after which this oil is recirculated through pipe 33, tank 20, pipe 21, etc., to absorb more heat from the heater 2. A sheet 36 of material to be saturated such as a sheet of roofing material for example, is passed over and under rollers 37 through the saturant in tank 18 thus absorbing this saturant and becoming waterproofed, fresh saturant being supplied from the stills 14 or supply tank 19 as it is being used up in the tank 18 and the temperature being maintained by the heat from the oil which is being circulated by means of the pumps 22. A battery of saturating tanks can be maintained at constant temperature by regulating the quantity of liquid hydrocarbon or oil going through coils 32 in tank 18 or through the jacket surrounding this tank. The pump 35 is provided so that the oil can be recirculated through heaters 25 and 28 a sufficient number of times to raise its temperature to the desired point before it is introduced into the tank 32. The pumps 22 each have two outlets so that the material can be circulated through either or both of the heating devices 25 or 28 thus obtaining a better control of the amount of heat taken up by the oil.

In the claims it is intended that the term " an asphalt saturant" shall include both an unoxidized flux oil and a partially oxidized flux oil.

I claim:

1. In a device of the class described in combination, a heater, means for passing a liquid through said heater in primary heat-absorbing relation to impart heat thereto, a tank for receiving said hot liquid, means for circulating a heating medium through said heater in secondary heat-absorbing relation and through said tank out of contact with said liquid but in heat transferring relationship thereto.

2. In a device of the class described, in combination, a heater, means for passing a liquid through said heater in primary heat-absorbing relation thereto to impart heat to said liquid, a tank for receiving said hot liquid, means for circulating a heating medium through said heater in secondary heat absorbing relation thereto and through said tank out of contact with said liquid but in heat transferring relationship thereto.

3. In a device of the class described, a tank, a heater having two sets of coils therein and means for heating said coils, means for passing a liquid through one of said coils and then into said tank, means for circulating a liquid through the other set of coils and through said tank out of contact with but in heat transferring relationship to said liquid.

4. In a device of the class described, a tank, a heater having two sets of coils therein, one in primary heat-absorbing relation thereto and the other in secondary heat-absorbing relation thereto and means for heating said coils, means for passing a liquid thru the primary coils and then into said tank, means for circulating another liquid thru the secondary coil and thru said tank out of contact with, but in heat-transferring relationship to, said liquid, thereby utilizing at least a part of the residual heat in the gases which have heated the primary coil.

5. The process which comprises heating an asphalt saturant and transferring it to a tank, and by means of the same source of heat heating an oil having a boiling point above that of water and circulating it between the source of heat and said tank to maintain the temperature of said asphalt.

6. The process which comprises heating

an asphalt saturant, subsequently oxidizing the same and transferring it to a tank, and by means of the same source of heat heating an oil having a boiling point above that of water and circulating it between the source of heat and said tank to maintain the temperature of said asphalt.

7. The process which comprises heating an asphalt saturant to about 425–475° F., and transferring it to a tank, by means of the same source of heat heating an oil having a boiling point above that of water and circulating it between the source of heat and said tank to maintain the temperature of said asphalt.

8. The process which comprises heating an asphalt saturant and transferring it to a tank and, by means of the same source of heat, heating an oil having a boiling point above that of water and circulating it between the source of heat and said tank out of contact with, but in heat-transferring relationship to, said saturant in order to maintain the temperature thereof.

In testimony whereof I affix my signature.

JOSEPH ZAVERTNIK, JR.