Dec. 18, 1934. A. O. VINZ 1,984,851

APPARATUS FOR TREATING COAL

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Fig. 1.

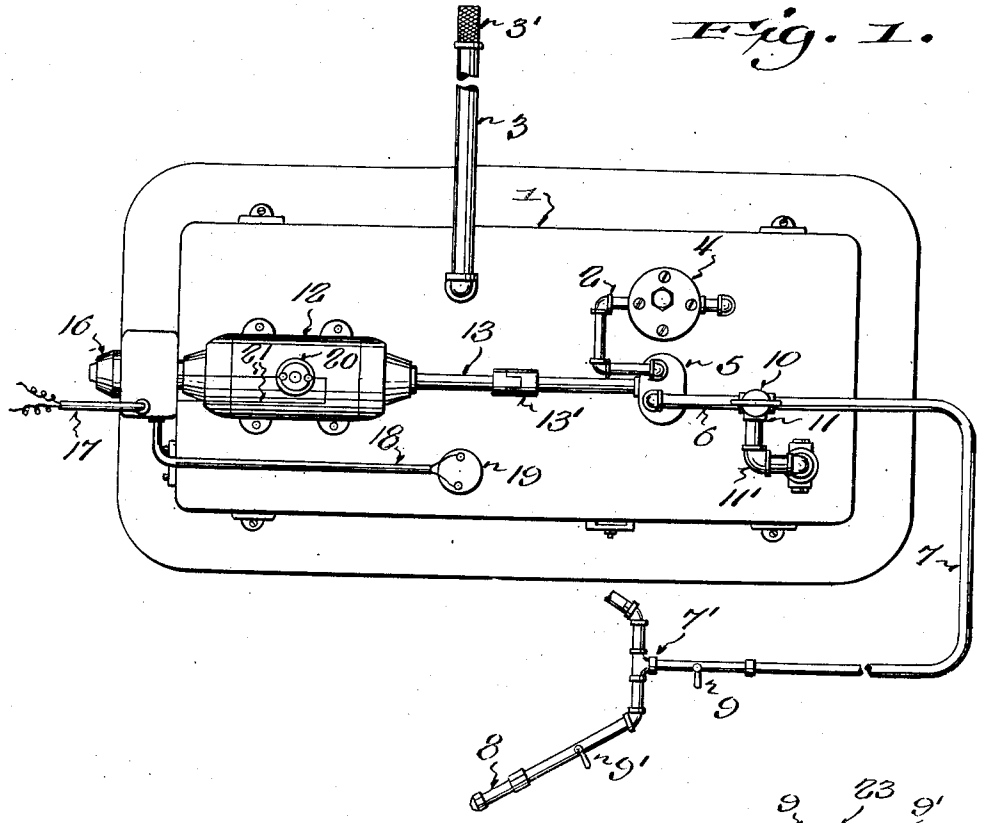
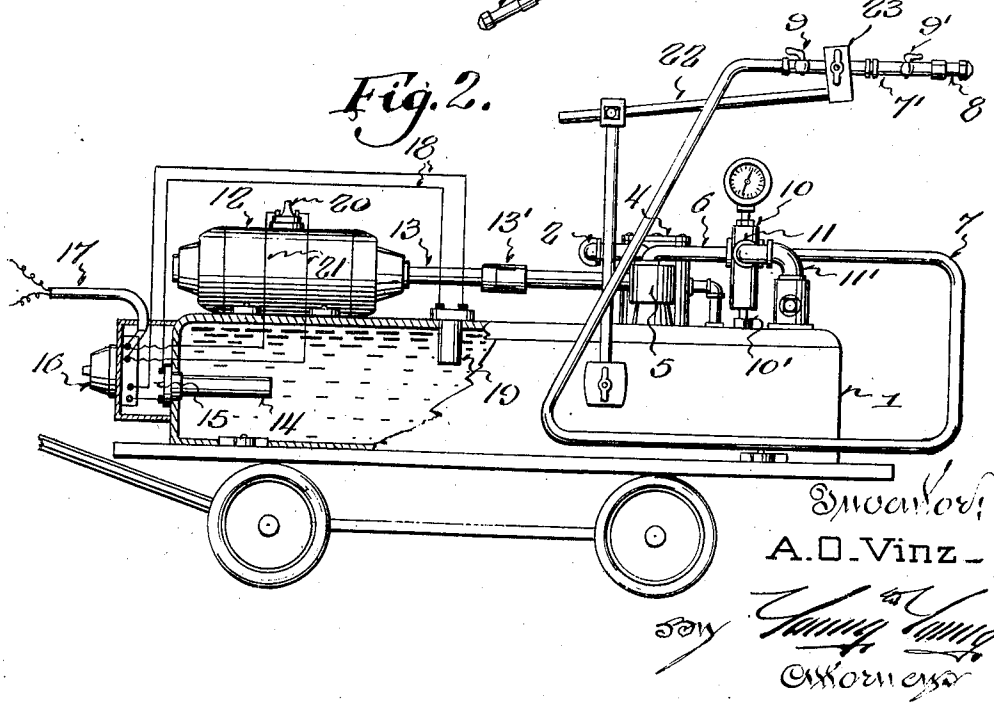


Fig. 2.



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APPARATUS FOR TREATING COAL

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8 Claims. (Cl. 299—46)

This invention pertains to an apparatus for treating coal with oil, to render the same substantially dustless during subsequent handling.

I am aware that it is old to treat coal with oil, but the apparatus heretofore employed has been cumbersome, costly, and extremely inefficient. Therefore, the present invention has primarily for its object to provide a comparatively simple and inexpensive apparatus for the treatment of coal with an exceptionally fine vapor or atomization of oil, whereby a minimum quantity of oil serves to coat a maximum bulk of coal.

Incidental to the foregoing, a more specific object resides in the provision of an apparatus, in which the oil is pre-heated to provide the desired viscosity for the most efficient atomization, regardless of inherent viscosity of the oil used, or the atmospheric temperatures encountered.

A further advantage of pre-heating resides in the fact that a small quantity will treat a maximum quantity of coal, thus effecting a material economy in the amount of oil required.

In connection with pre-heating, a further object resides in the provision of means for thermostatically and automatically controlling the heating element, whereby economy is effected and overheating prevented.

A still further object resides in continuously circulating a portion or all of the oil in contact with the heating element, whereby the most efficient and economical heating is obtained, and heat loss reduced to a minimum.

A further object in connection with the foregoing resides in the novel means for controlling the discharge of oil, whereby the vapor, or mist, may be regulated to a high degree of certainty regardless of variation in the pressure exerted upon the oil.

A still further object resides in the arrangement of the pump for withdrawing oil from the top of the oil receptacle, whereby the system may be readily primed by merely tilting the receptacle.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the novel construction, combination, and arrangement of parts, substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

In the accompanying drawing is illustrated one complete example of the physical embodiment of the present invention constructed according to the best mode so far devised for the practical application of the principles thereof.

In the drawing:—

Figure 1 is a plan view of an apparatus constructed in accordance with one form of the present invention; and

Figure 2 is an elevation with parts thereof broken away and in section to more clearly illustrate the structural details.

Referring now more particularly to the accompanying drawing, wherein the apparatus is illustrated as a portable unit, it is to be understood that the principles of the invention may be variously embodied in either a portable or stationary apparatus. Likewise, the invention may be constructed in one or more units and of various sizes and capacities without departing from the principles thereof.

In that form of the invention illustrated, the numeral 1 designates a tank, or container, having a suction line 2 connected therewith to provide reduced pressure within the tank, thus causing oil to be supplied thereto through the line 3, provided with a strainer 3' at its outer end for insertion into any suitable storage receptacle (not shown).

Connected in the suction line 2 is a conventional strainer, or filter, 4, which traps and eliminates any solid particles contained in the oil that might subsequently plug the atomizing nozzle or nozzles, to be later described.

A pump 5 of conventional structure is positioned upon the top of the receptacle 1, and through the suction line 2 reduces the pressure within the tank 1, and discharges oil drawn therefrom through the discharge line 6, to which a flexible hose or pipe line 7 is connected.

Secured to the outer end of the hose is a forked fitting 7', which carries a pair of atomizing nozzles 8 designed to deliver the oil in a vapor or fine mist. The purpose in utilizing a plurality of nozzles is to provide for a different volume of discharge, the orifices in the nozzles being of different sizes.

The fitting 7' may be provided with a cut-off cock 9, while each of the nozzles 8 is independently controlled by the cocks 9'.

In order to regulate the pressure exerted upon the oil at the discharge nozzles, whereby the same is delivered in a fine vapor, or mist, a pressure valve 10 is connected in the discharge line 6 and is provided with a regulating stem 10' and a bypass outlet 11, connected with the tank 1 through a return line 11'.

Obviously, the valve 10 permits a portion of the

oil from the pump 5 to be forced through the discharge line and consequently the pressure line and nozzles, while the excess oil is by-passed through the valve and returned to the tank through the line 11'. In the event that the nozzles are cut off, then all of the oil is returned to the receptacle and circulated therethrough.

The pump 5 is actuated by an electric motor 12, connected directly therewith through the shaft 13, which is provided with the usual flexible connection 13' of any conventional design.

In order to pre-heat the oil, and reduce the same to the desired viscosity for more efficient atomization under any temperatures, an electric heating element 14 is inserted into the receptacle 1, and is provided with a protruding head 15, which carries the terminals to which the circuit wiring is connected.

While various controls and circuits may be employed for the motor 12 and the electric heating element 14, a preferred form is illustrated, in which a three-step switch 16 is connected with the supply circuit 17, and the heating element 14 through the circuit 18, to provide for a variable heat in the element 14, which is submerged in the oil contained within the receptacle 1, a thermo-circuit breaker 19 is connected in the circuit 18 and inserted into the tank where it is affected by the temperature of the oil contained therein.

Likewise, in order to prevent overheating and burning out of the motor 12, the same is provided with a thermal switch 20, which automatically breaks the motor circuit 21 in the event that the motor becomes overheated.

For the purpose of convenience the receptacle 1 may be provided with a suitable adjustable bracket 22 provided with a clamp 23 for reception of the nozzle fitting 7', thus permitting the same to be held in the desired adjusted position for the discharge of the oily vapor upon the coal either in a bin or traveling through a conveyor.

From the foregoing explanation, considered in connection with the accompanying drawing, it will be quite apparent that an exceedingly simple, compact, and comparatively inexpensive apparatus has been provided for the atomization of oil, particularly adapted for the treatment of coal, to render the same dustless during subsequent handling.

Obviously, pre-heating of the oil reduces its viscosity so that the same may be most efficiently atomized regardless of atmospheric temperatures, and regardless of the inherent viscosity of the oil utilized, thus effecting a material economy, not only in consumption, but permitting use of the heavier and cheaper grades of oil.

It will further be seen that extremely simple means has been provided for controlling the discharge or atomization of oil to a high degree of certainty, regardless of variation in pressure exerted thereon, and due to the fact that a portion of the oil is continuously returned to the tank 1, and circulated in contact with the heating element 14, a material economy in heat is effected, and viscosity of the oil is reduced in a minimum period of time.

While the heating element 14 has been shown and described in connection with the circulating tank 1, it is to be understood that the same may be applied to the storage receptacle from which the oil is drawn. Also, instead of by-passing and returning a portion of the oil to the tank 1, the same may be returned to the storage receptacle without departing from the principles of the invention.

In the application of the present invention the same may be installed in connection with a bin or hopper to treat the coal contained therein, or the same may be positioned over a delivery chute or conveyor to discharge a vapor or mist upon the coal as the same travels therethrough, it being understood that the volume of discharge can be readily controlled through the selective use of the nozzles 8 and regulation of the valve 10, whereby any amount of oil desired in proportion to the quantity of coal to be treated is available.

I claim:—

1. An apparatus for atomizing heated oil comprising, an auxiliary storage receptacle having a supply line for communication with a main storage reservoir, a circulation line having its opposite ends in communication with said receptacle, a valve positioned in said circulation line, a discharge line connected with said valve, said valve serving to regulate the amount of oil admitted to said discharge line and to permit either a portion or all of the oil forced through the circulation line to be returned to said auxiliary receptacle, a pump positioned in said circulation line between its inlet end and said valve for circulating oil through said line and reducing the pressure within said receptacle as oil is discharged from the circulating line, causing the withdrawal of oil from the main reservoir and automatically maintaining a substantially constant level of oil in said receptacle at all times, and means located within said receptacle for heating the oil contained therein.

2. An apparatus for atomizing heated oil comprising, an auxiliary storage receptacle having a supply line for communication with a main storage reservoir, the circulation line having its opposite ends in communication with said receptacle, a valve positioned in said circulation line, a discharge line connected with said valve, said valve serving to regulate the amount of oil admitted to said discharge line and to permit either a portion or all of the oil forced through the circulation line to be returned to said auxiliary receptacle, a pump positioned in said circulation line between its inlet end and said valve for circulating oil through said line and reducing the pressure within said receptacle as oil is discharged from the circulation line, causing the withdrawal of oil from the main reservoir and automatically maintaining a substantially constant level of oil in said receptacle at all times, means located within said receptacle for heating the oil contained therein, and a filter positioned in said circulation line.

3. An apparatus for atomizing heated oil comprising, an auxiliary storage receptacle having a supply line for communication with a main storage reservoir, a circulation line having its opposite ends in communication with said receptacle, a valve positioned in said circulation line, a discharge line connected with said valve, said valve serving to regulate the amount of oil admitted to said discharge line and to permit either a portion or all of the oil forced through the circulation line to be returned to said auxiliary receptacle, a pump positioned in said circulation line between its inlet end and said valve for circulating oil through said line and reducing the pressure within said receptacle as oil is discharged from the circulating line, causing the withdrawal of oil from the main reservoir and automatically maintaining a substantially constant level of oil in said receptacle at all times, and means located within said receptacle and below the connections

of said supply line and circulation line for heating oil contained therein.

4. An apparatus for atomizing heated oil comprising an auxiliary storage receptacle having a supply line in communication with a main storage reservoir, a circulation line having its opposite ends in communication with said receptacle adjacent one end thereof, a valve positioned in said circulation line, a discharge line connected with said valve, said valve serving to regulate the amount of oil admitted to said discharge line and to permit either a portion or all of the oil forced through the circulation line to be returned to said auxiliary receptacle, a pump positioned in said circulation line between its inlet end and said valve for circulating oil through said line and reducing the pressure within said receptacle as oil is discharged from the circulating line, causing the withdrawal of oil from the main reservoir and automatically maintaining a substantially constant level of oil in said receptacle at all times, and means located within said receptacle for heating the oil contained therein.

5. An apparatus for atomizing heated oil comprising an auxiliary storage receptacle having a supply line for communication with a main storage line, a circulation line having its opposite ends in communication with said receptacle adjacent one end thereof, a valve positioned in said circulation line, a discharge line connected with said valve, said valve serving to regulate the amount of oil admitted to said discharge line and to permit either a portion or all of the oil forced through the circulation line to be returned to said auxiliary receptacle, a pump positioned in said circulation line between its inlet end and said valve for circulating oil through said line and reducing the pressure within said receptacle as oil is discharged from the circulating line, causing the withdrawal of oil from the main reservoir and automatically maintaining a substantially constant level of oil in said receptacle at all times, and means located within said receptacle below the connections of said supply line and circulation line for heating the oil contained therein.

6. An apparatus for atomizing heated oil comprising a portable storage receptacle having a supply line for communication with a main storage reservoir, a circulation line having its opposite ends in communication with said receptacle adjacent one end thereof, a valve positioned in said circulation line, a discharge line connected with said valve, said valve serving to regulate the amount of oil admitted to said discharge line and to permit either a portion or all of the oil forced through the circulation line to be returned to said auxiliary receptacle, an atomizing nozzle carried by the discharge line, a pump positioned in said circulation line between its inlet end and said valve for circulating oil through said line and reducing the pressure within said receptacle as oil is discharged from the circulation line, causing the withdrawal of oil from the main reservoir and automatically maintaining a substantially constant level of oil in said receptacle at all times, means located within said receptacle below the connections of said supply line and circulation line for heating the oil contained therein, and a filter positioned in said circulation line.

7. An apparatus for atomizing heated oil comprising, an auxiliary storage receptacle having a supply line for communication with a main storage reservior, a circulation line having its opposite ends in communication with said receptacle, a discharge line connected with said circulation line, means for restricting the return of said circulation line to said auxiliary receptacle to permit either a portion or all of the oil forced through the circulation line to be returned to said auxiliary receptacle, a pump positioned in said circulation line between its inlet end and said discharge line for circulating oil through said line and reducing the pressure within said receptacle as oil is discharged through the circulation line causing withdrawal of oil from the main reservoir and automatically maintaining a substantially constant level of oil in said receptacle at all times, and means located within said receptacle for heating the oil contained therein.

8. An apparatus for treating coal with heated oil comprising an auxiliary storage receptacle, means for reducing pressure within said receptacle to draw unheated oil from a main storage container, a conduit constituting a circulating system for said receptacle arranged exteriorly thereof, said means acting to circulate oil under pressure in said conduit while simultaneously functioning to draw unheated oil into said receptacle, a discharge line communicating with said conduit, means located in said receptacle for heating the oil circulated in said system, the replenishment and discharge from said receptacle being simultaneous and of substantially equal rate whereby substantially a constant level is maintained at all times in said receptacle.

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