

Device and method for separating a solid matter-containing, liquid and pumpable tar suspension with delivery-free use of the separated solid matter contained therein

[0001] The invention relates to a contrivance for fractionating a solids-containing, liquid and pumpable tar suspension and for utilising the isolated solid that was contained therein without the need for it to be conveyed, said contrivance being located in the upper part of a coal storage container and said contrivance consisting of a centrifuge that fractionates a solids-containing, pumpable tar or a solids-containing, pumpable tar suspension into a liquid phase and the solids contained therein so that the solid can be placed directly onto or into the stored coal without subsequent conveyance so that only a tar suspension needs to be pumped or transported and not any of the isolated solid. The invention also relates to a process for fractionating a solids-containing, liquid and pumpable tar suspension and for storing the solid obtained with coal as well as application of the process to produce coke from coal blended with the solid.

[0002] The coking of coal to produce coke often creates a viscous solids-laden tar suspension that needs to be fractionated for further processing. Due to the consistency of the tar, fractionation of the solid is usually carried out using a centrifuge, but this entails the problem that the solid obtained needs to be conveyed or transported following fractionation. This involves substantial expense.

[0003] Processes for the fractionation of tar suspensions from coking processes are known. JP 07188671 A describes a process for fractionating tar suspensions and utilising the solid obtained, said process involving dilution of a tar suspension that is obtained from a coking process, the dilution obtained being centrifuged, and the solid obtained as well as the tar that has been freed of the solid being further processed. GB 789709 A describes a process for fractionating liquid and solid components from hard coal tar, said process involving the production of an aqueous dispersion with the aid of suitable additives and said dispersion being fractionated by a centrifuge into a supernatant liquid phase and the solids contained therein.

[0004] These processes have the disadvantage that the sticky tar-containing solids obtained need to be conveyed or transported. A common process for further use of the solid is, for example, to blend it with feedstock coal and store both together. However, due to the consistency of the tar-containing solid, the devices used for conveyance, such as screw or belt conveyors, are susceptible to failures, largely ineffective or

require the use of additional costly devices, such as high-pressure double-walled delivery lines.

[0005] Therefore, the objective is to provide a process for improving or avoiding the difficulties encountered in conveying the solid recovered from the fractionation of a solids-containing, liquid and pumpable tar suspension and for utilising the solid without the need for it to be conveyed, the intention being to add said solid obtained from the fractionation to the coal stock.

[0006] The invention achieves this objective by means of a contrivance consisting of a centrifuge located in the upper inside section of a coal storage container, said centrifuge being equipped with a feed nozzle for solids-containing liquid tar, a discharge nozzle for liquid tar centrifugate and in the bottom part an outlet for the solid contained in the tar. After centrifuging, the solids obtained from the centrifugation preferably fall by gravitational force into the coal storage container where the coal is being stored.

[0007] This obviates the need for the solid to be conveyed from the centrifuge or a downstream container to the coal storage container. The solids from the centrifuging process fall directly into the coal in the coal storage container. The centrifuged liquid tar is discharged from the centrifuge in the container via a line with a pump. This liquid tar can be returned to a feed tank or further exploited. The solids-containing, liquid and pumpable tar suspension can be diluted or blended with additives prior to centrifugation. The coal storage container may, for example, be a coal storage silo.

[0008] What is claimed in particular is a contrivance for fractionating a solids-containing, liquid and pumpable tar suspension from a coking reaction and for using the isolated solid that was contained therein without the need for it to be conveyed, characterised in that

- said contrivance consists of a centrifuge located in the upper inside section of a coal storage container, and
- the centrifuge is equipped with a feed nozzle for solids-containing, liquid tar and having a discharge nozzle for liquid tar centrifugate, and
- the centrifuge is equipped with an outlet at the bottom for the solid contained in the tar.

[0009] What is also claimed is a process for fractionating a solids-containing, liquid and pumpable tar suspension from a coking reaction and utilising the isolated solid that

was contained therein without the need for it to be conveyed by using the contrivance according to the invention. Said process is characterised in that a liquid, solids-containing and pumpable tar suspension is pumped into a centrifuge located in the upper section of a coal storage container, said centrifuge fractionating the tar suspension into a liquid tar centrifugate and a solid, and the solid is placed onto or into the coal, which is located in the coal container, without further conveyance or transport.

[0010] The solid which is obtained from the centrifugation and placed on the coal is preferably stored with the coal. Settling normally allows the solid obtained from the centrifugation to be stored with the coal in the coal storage container or the coal can even be mixed with the solid obtained from the centrifugation using suitable devices. Preferably, the solids-containing, liquid and pumpable tar suspension used for centrifugation originates from a process for the production of coke from coal.

[0011] What is also claimed is the use of a coal that contains a solid which is obtained by fractionating a solids-containing, liquid and pumpable tar suspension using a centrifuge in the upper inside section of a coal storage solid. Said coal can be used in particular for coking and for the production of coke.

[0012] The invention has the advantage that no cost-intensive pumping is required to convey the solid from the centrifugation of a solids-containing, liquid and pumpable tar suspension. The solid goes directly from the centrifuge onto the stored coal. It is only solids-containing, pumpable tar suspension or liquid tar that needs to be pumped. A considerable amount of energy or equipment is thus saved.

[0013] The configuration of a process for the coking of coal according to the invention is explained in greater detail by means of two drawings. The first drawing shows a prior-art device and the second shows a contrivance according to the invention. The process according to the invention is not limited to this configuration.

[0014] FIG. 1 shows a device according to the prior art. The liquid, solids-containing and pumpable tar suspension (1) is pumped to a centrifuge (3) by a pump (2a), where the supernatant liquid tar (4), which is pumped by a pump (2b) for further use, and the isolated solid (5) previously contained therein are obtained. Said solid (5) is put in a container (6) for storing coal (7). The transported solid from the tar (5a) is passed into the container (6) via a conveyor belt (8) or a screw conveyor. The solid from the tar (5b) is stored on the coal (7). The coal (7) can be removed from the container (6) via a suitable opening (9a) or topped up via another opening (9b).

[0015] FIG. 2 shows a contrivance according to the invention. The liquid, solids-containing and pumpable tar suspension (1) is pumped to a centrifuge (3) by a pump (2a). According to the invention, the centrifuge (3) is located in the upper inside section of the container (6) for storing coal (7). In the centrifuge (3) the tar suspension is fractionated into supernatant liquid tar (4) and the solid (5) contained in the tar suspension. Said solid falls out of the openings (3a) in the centrifuge (3) onto the coal (7) by gravitational force (5b) and is stored there (5c). The liquid tar (4) is pumped out via a pump (2b). The coal (7) can be removed from the container (6) via a suitable opening (9a) or topped up via another opening (9b).

[0016] List of reference numbers and designations

- 1 Liquid, solids-containing and pumpable tar suspension
- 2a Pump (for liquid, solids-containing and pumpable tar suspension)
- 2b Pump (for liquid tar)
- 3 Centrifuge
- 3a Centrifuge openings
- 4 Liquid tar or tar centrifugate
- 5 Isolated solid
- 5a Transported solid
- 5b Solid stored on coal
- 5c Solid falling out of the centrifuge
- 6 Container
- 7 Coal
- 8 Conveyor belt
- 9a Opening for removing coal
- 9b Opening for topping up coal

Claims

1. Contrivance for fractionating a solids-containing, liquid and pumpable tar suspension (1) and utilising the isolated solid that was contained therein (5) without the need for it to be conveyed, **characterised in that**
 - 5 • said contrivance consists of a centrifuge (3) located in the upper inside section of a coal storage container (6), and
 - the centrifuge (3) is equipped with a feed nozzle for solids-containing, liquid tar (1) and having a discharge nozzle for liquid tar centrifugate (4), and
 - 10 • the centrifuge (3) is equipped with an outlet (3a) at the bottom for the solid (5) contained in the tar (1).
2. Process for fractionating a solids-containing, liquid and pumpable tar suspension (1) and utilising the isolated solid (5) that was contained therein without the need for it to be conveyed, **characterised in that**
 - 15 • a liquid, solids-containing and pumpable tar suspension (1) is pumped into a centrifuge (3) located in the upper section of a coal storage container (6), and
 - the centrifuge (3) fractionates the tar suspension (1) into a liquid tar centrifugate (4) and a solid (5), and
 - 20 • the solid (5) is placed onto or into the coal (7), which is located in the coal container (6), without the need for further conveyance or transport.
3. Process for fractionating a solids-containing, liquid and pumpable tar suspension (1) and utilising the isolated solid (5) that was contained therein without the need for it to be conveyed according to claim 2, **characterised in that** the solids-containing, liquid and pumpable tar suspension (1) originates from a process for the production of coke from coal (7).
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4. Process for fractionating a solids-containing, liquid and pumpable tar suspension (1) with direct use of the isolated solid (5) that was contained therein according to one of claims 2 or 3, **characterised in that** the solid (5) which is obtained by centrifugation and placed on the coal (7) is stored (5c) with the coal (7).
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5. Use of a coal (7) containing solid material (5c) from the fractionation of a solids-containing, liquid and pumpable tar suspension (1) and its utilisation without the need for it to be conveyed according to one of claims 2 to 4, **characterised in that**
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- a coal (7) blended with solid material (5) or tar centrifugate (4) obtained from the centrifuge (3) is used for coking or the production of coke.