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(54) System and method for transferring material

(57) The system for transferring particulate material to a filter making apparatus comprises a main loading unit, a supply container and a filter making apparatus. The main loading unit comprises an inlet port connectable to an external reservoir of particulate material for the transfer of particulate material from the external reservoir of particulate material into the main loading unit. The main loading unit further comprises a closable outlet port. The supply container comprises a closable supply inlet connectable to the closable outlet port of the main loading unit for receiving particulate material from the main loading unit. The supply container further comprises a closable supply outlet, which is connectable to the filter making apparatus for transferring particulate material from the supply container to the filter making apparatus.

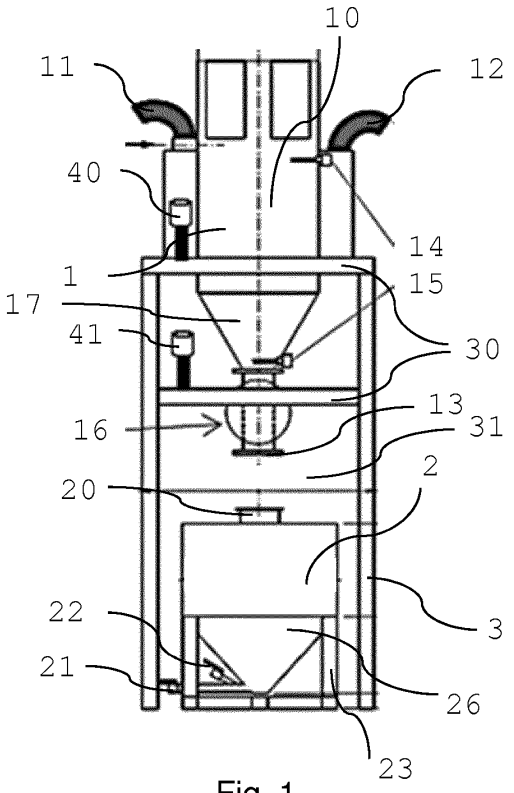

Fig. 1

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Description

[0001] The invention relates to a system and method for transferring particulate material to a filter making apparatus. More particularly, the invention relates to a system and method for transferring particulate material, such as for example carbonaceous particulate material, from a main loading unit into a supply container for use in the manufacture of filters or filter elements for smoking articles.

[0002] It is known in prior art manufacturing methods to add carbon or other substances to cigarette filters. However, given the particulate property of carbon particles, carbon has to be handled with great care. Otherwise, contamination of the manufacturing facility and of products with carbon particles may occur. In addition, carbon dust has the risk of combusting unintentionally.

[0003] Therefore, there is a need for an improved system and method for handling and transferring particles from a supply to a filter making apparatus. Especially, there is a need for such a system and method which facilitates the handling of particulate material, such as carbon.

[0004] According to a first aspect of the present invention, there is provided a system for transferring particulate material to a filter making apparatus. The system comprises a main loading unit comprising a hollow body with an inlet port connectable to an external reservoir of particulate material for the transfer of particulate material from the external reservoir of particulate material through the inlet port into the hollow body. The hollow body further comprises a closable outlet port. The system further comprises a supply container comprising a closable supply inlet connectable to the closable outlet port of the hollow body for receiving particulate material from the main loading unit. The supply container also comprises a closable supply outlet. Yet further, the system comprises a filter making apparatus connectable to the closable supply outlet of the supply container for receiving particulate material from the supply container.

[0005] The system according to the invention allows the loading of a main loading unit and the filling of a supply container with particulate material from the main loading unit. The supply container may then be used for supplying the particulate material to a filter making apparatus. Particulate material may for example be carbonaceous particulate material or particulate flavor release mechanisms such as for example, capsules or plant material like tobacco beads or plant leaf material like for example tobacco leafs, mint leafs or other. Also, particulate material may be a mixture of such material. At the filter making apparatus, the particulate material may be introduced for example into filter tow or into empty spaces in a filter element or between adjacent filter segments.

[0006] According to the invention, the filling of the supply container takes place at the location of the main supply unit, which location is preferably remote from the location of the filter making apparatus. Accordingly, the supply container is preferably portable and may be transported from the main loading unit to the filter making apparatus by appropriate transport means, such as for example a forklift truck. Closable supply inlet and supply outlet of the supply container allow for a closed supply container also when not in use or when transferring the supply container between main loading unit and filter making apparatus. With a closable outlet port of the main loading unit it may be achieved that no particulate material leaves the main loading unit when the main loading unit is not connected, for example, to a supply container or directly to a filter making apparatus. In addition, with a closable outlet port, a filling of the main loading unit may be performed separately from a transfer of particulate material from the main loading unit to for example the supply container.

[0007] The system according to the invention may be operated as a closed system. Particulate material may be filled into a receptacle of the system and from one to another receptacle while being kept in the system. This way, advantageously, the contact with the environment outside of the system can be avoided or minimized, for example the contact with manufacturing equipment of products. Preferably, the individual receptacles of the system, especially a main loading unit and one or several supply containers, are provided with closable openings. This further secures that particulate material is kept in the system and transferred only to the location intended for preventing stray particulate material. Especially, particulate material may be prevented from contaminating a machine or machine parts. Particulate material may also be prevented from contaminating for example filter elements that may not or are no intended to contain such a particulate material. A further advantage of a closed system or of closed components of the system is that the opportunities of contaminating the particulate material are minimized. In addition, particulate material in a closed system may be subject to its own climate. A closed system may especially provide stable temperature and moisture conditions for the particulate material in the system regardless of the environment outside of the closed system. This advantageously can prevent or reduce that for example, humidity causes agglomeration of particulate material, which could make a future transfer of particulate material less reliable. Especially, a supply container that is transported from a filling location to the location of the filter making apparatus or to any another location, for example an intermediate storage location, may be influenced by different environmental conditions. In a closed supply container particulate material may be protected from such environmental influences. Therefore, openings provided in the system according to the invention, especially openings provided in a supply container, are preferably closable openings that are only opened when needed, for example upon filling or emptying.

[0008] Particulate material may also be supplied to a filter making apparatus directly from the main loading unit. A connection from the outlet port of the main loading

unit to the filter making apparatus is then preferably a transport tube. Several transport tubes may be provided if the main loading unit is to be connected to several filter making apparatuses.

[0009] Connections between the individual components of the system may be designed in an airtight manner or preferably in a manner to prevent particulate material from leaving the system inadvertently. Preferably, the supply inlet is opened only shortly before it is connected to the outlet port of the main loading unit or after it has been connected to the outlet port of the main loading unit. Accordingly, a supply outlet is preferably only opened when being connected to a filter making apparatus. If valves are arranged in a connection, a connection is preferably installed before the valve is opened and a valve is closed before a connection is disconnected. Preferably, connections are releasable connections, preferably easy to connect and to disconnect. Releasable connections are non-permanent connections and may for example be connections with clamps, bayonet nut connectors, screwed fastening or form-fit connections. Non-releasable connections may for example be welded or snap-fit connections.

[0010] The system according to the invention is especially suitable for the transfer of particulate material used in the manufacture of filters or filter elements for smoking articles. Space provided at a manufacturing site, for example at the location of a filter making apparatus, is often limited. In addition, particulate material added to filter elements is to be supplied to specific locations in the filter elements only. With the system according to the invention, particulate material may be prevented from contaminating other filter elements that shall not contain such a particulate material. Additionally, particulate material may be prevented from contaminating other machine parts. This is especially favourable, since stray particulate material may damage the manufacturing equipment or may require increased maintenance of the apparatus. Often, particulate material used in the manufacture of filter elements of smoking articles is carbonaceous particulate material, for example charcoal. Especially charcoal is prone to spreading and to stain easily such that it is favorable to keep any handling with particulate material, especially of charcoal, at a remote location and in a closed environment.

[0011] Main loading unit and supply container may be arranged such that a transfer of particulate material from the main loading unit into the supply container is performed by gravitational force. This may for example be achieved by arranging the closable outlet opening of the hollow body of the main loading unit at a bottom end of the hollow body. Thereby, the closable outlet opening faces downwardly. Additionally, the closable supply inlet is arranged at an upper side or in a top wall of the supply container. By this, outlet port and supply inlet may be arranged above each other. Preferably, the closable supply outlet is arranged at a lower side or in the bottom wall of the supply container. By this, a complete emptying of the supply container is facilitated by the position of the supply outlet in the supply container.

[0012] The main loading unit may be fixedly installed, while the supply container preferably is portable. The main loading unit may itself be filled from an external reservoir. An external reservoir may for example be a storage room for particulate material or a conventional large size bag particulate material is delivered in. Particulate material may be transferred from an external reservoir to the main loading unit by any suitable transfer means as known in the art, for example by means of a pump that is supplying suction or pressure to a transport line connecting the external reservoir and the main loading unit. A connection between external reservoir and main loading unit may be of a permanent kind.

[0013] An amount or flow of particulate material transferred from one component to another component of the system may be measured. For example, an amount filled into the main loading unit or transferred from the main loading unit to the supply container may be measured or controlled. This may for example be done by arranging a flow meter in the connection between two components, such as main loading unit and supply container. A flow meter may for example also be used to indicate a filling status or an ongoing filling process, or to initiate a filling process.

[0014] The main loading unit or supply container may be provided with mixing means or agitating means or a combination of both. For example one or more pin wheels or other form of mixers may be arranged in the hollow body of the main loading unit or in the supply container. Alternatively or in addition, an agitation means in the form of a gas supply may be provided to supply one or several gas jets into the unit or into the container. Advantageously, the mixing means and agitating means keep particulate material agitated and support a mixing and a loosening up of particulate material. By the mixing and agitation an agglomeration of particulate material may be prevented and an emptying of the main loading unit or supply container is facilitated. Preferably, mixing and agitating means are provided in the main loading unit. This may be particularly advantageous where the particulate material comprises more than one kind of particulate materials that are mixed in the main loading unit by the mixing means. Different kinds of particulate material that may form a mixture of particulate material are for example flavour carrying particulate material and non-flavour carrying particulate material or carbonaceous particulate material and capsules. For example, the mixture may comprise charcoal particles and viscopearls™ (wherein viscopearls™ are liquid containing capsules of diameters of for example between about 0.2mm and about 0.7mm). Alternatively, or in addition, the mixture of particles may be physically similar particles that are carrying different flavours for example particles of mint leaves and tobacco leaves).

[0015] According to an aspect of the system according to the invention, the system further comprises a valve

arranged at the closable outlet port of the hollow body of the main loading unit. The valve is adapted to provide an open or closed fluid connection between the hollow body and the supply container, when main loading unit and supply container are connected to each other.

[0016] The valve may be closed or opened depending on the process step to be performed using the system according to the invention. The valve may for example be part of the main loading unit and directly serve as closure for the closable outlet port of the hollow body. In addition, the valve may define the status of the fluid connection, that is, the openness or closeness of the connection, independently of any further closures of the outlet port or the supply inlet. For example, activation of the valve may be interrupted if the connection between main loading unit and supply container is not complete or defective. If a filling of the supply container shall be stopped, this is preferably done by closing the valve. However, an interruption of a filling process may also be achieved by not further filling the main loading unit where the inlet port of the main loading unit is in an open state and particulate material is loaded into the main loading unit at the same time as a transfer of particulate material to the supply container takes place. Preferably, the valve is linked to a control unit and the status of the valve is surveyed and controlled by the control unit.

[0017] Further valves may be provided in the system, for example at the inlet port of the main loading unit or at the supply outlet of the supply container. Preferably, one or several valves are controlled by a control unit. Preferably, the system further comprises one of a valve, a filling level sensor, a pump and a control unit for controlling at least one of the valve, the filling level sensor, and the pump comprised in the system.

[0018] A valve may be a valve as described above, for example a flow control valve arranged in the connection between main loading unit and supply container.

[0019] A filling level sensor may be arranged in the main loading unit or in the supply container. Preferably, such a sensor is arranged inside and at an upper end of the components, such as for example at an upper end of the hollow body of the main loading unit. An upper filling level sensor may be used to indicate if a maximum filling level with particulate material is reached. Preferably, a second filling level sensor is arranged inside and at a lower end of a component, for example at a lower end of the hollow body. A lower filling level sensor may indicate if a minimum filling level with particulate material is reached, for example of the main loading unit or the supply container. A filling level sensor may for example be a vibration limit switch for bulk solids, which is especially suitable for fine-grain or powdery media. Preferably, a filling level sensor is controlled by a control unit. For example, the control unit initiates an interruption of a filling process as soon as the control unit detects a required filling level or a maximum filling level. Preferably, a signal corresponding to for example a maximum filling level is provided to the control unit for example by a filling level sensor or for example also by a flow sensor. According to the invention a control unit may also activate a filling process, if for example a minimum filling level is detected.

[0020] Preferably, a pump is controlled by the control unit. Such a pump may for example be provided for supporting the filling of the main loading unit.

[0021] By the control unit, further elements or process steps may be controlled, such as, for example, a filling amount or filling duration of particulate material or a transfer duration of particulate material. The control unit may further be provided with an input console for input of system operation data or process operation data. Preferably, one control unit is used to control the system according to the invention.

[0022] The system may be provided with further sensors. Preferably, the system further comprises a sensor indicating the type of particulate material provided in the system. Such a further sensor may facilitate the identification of the content of for example a main loading unit or a supply container. This is especially favorable if various types of particulate material are used in the system.

[0023] According to another aspect of the system according to the invention, the system further comprises a transport device for transporting the supply container from a location of the main loading unit to a location of the filter making apparatus.

[0024] With the transport device, the supply container may be transported to the main loading unit for filling with particulate material. The supply container may also be transported to the respective filter making apparatus after having been filled with particulate material. The portable supply container allows for a flexible use of the supply container. It also allows for the provision of a filled supply container ready for use, while another supply container is still supplying particulate material to a filter making apparatus. With a portable supply container, also the main loading unit may be located remote from the location of the filter making apparatus. Thus, not much space for particulate material and no space for a particulate material reservoir is required at the location of the filter making apparatus. Thus, formation of dust that might develop when transferring particulate material remains at a remote location.

[0025] According to the invention, the transport device may be an individual transport equipment such as for example a forklift truck. Alternatively, or in addition, the transport device may also be a transport device with a predetermined motion path, such as a travelling trolley on rails.

[0026] According to another aspect of the system according to the invention, the system comprises a plurality of filter making apparatuses. The system also comprises a distribution element arranged between the plurality of filter making apparatuses and the supply container for distributing particulate material from the supply container to the plurality of filter making apparatuses.

[0027] According to the invention the supply container

may be used for supplying particulate material not only to one filter making apparatus, but also to two or more filter making apparatuses. A distribution element then distributes the particulate material from the supply container to the plurality of filter making apparatuses. A distribution element may for example be a distributor or a plurality of tubes leading from the supply container to the plurality of filter making apparatuses. In some preferred embodiments of the system according to the invention, the supply container comprises a plurality of closable supply outlets. Therein, each of the closable supply outlets of the plurality of closable supply outlets is connectable to one filter making apparatus of the plurality of filter making apparatuses. The amount of particulate material supplied to a plurality of filter making apparatuses by one supply container may be the same or different for one or several filter making apparatuses. Preferably, a control or adjustment element of an amount of particulate material supplied is integrated into the distribution element.

[0028] According to another aspect of the invention, there is provided a main loading unit for use in a system for transferring particulate material to a filter making apparatus, preferably for use in a system according to the invention and as described herein. The main loading unit comprises a hollow body with an inlet port arranged at an upper end of the hollow body. The inlet port is connectable to an external reservoir of particulate material for the transfer of particulate material from the external reservoir of particulate material through the inlet port into the hollow body. The hollow body further comprises a closable outlet port arranged at a lower end of the hollow body. Preferably, the closable outlet port is adapted for connecting the main supply unit to a closable supply inlet of a supply container. By this the particulate material may be transferred from the main loading unit to the supply container before being supplied to a filter making apparatus. However, the outlet port may also be adapted to be directly connected to one or a plurality of filter making apparatuses. If the closable outlet port is directly connectable to a filter making apparatus, this is preferably done via a transfer tube.

[0029] Aspects and advantages of the main loading unit have been described with reference to the system according to the invention and will not be repeated.

[0030] According to another aspect of the main loading unit according to the invention, the main loading unit further comprises a support structure. The hollow body of the main loading unit is mounted at an elevated level in the support structure and such that the closable outlet port faces downwardly. The support structure further provides a space within the support structure and beneath the hollow body for receiving a supply container arrangeable below the closable outlet port of the hollow body.

[0031] The provision of a support structure such as for example a rack allows a secure mounting of the hollow body. It allows the mounting of the hollow body and the outlet port in a position to make use of gravitational force when dispensing particulate material from the main loading unit. Preferably, a space in the support structure is provided below the hollow body. The space facilitates the provision of transfer equipment, such as one or several transport tubes to be connected to the outlet port of the main loading unit. Preferably, the support structure provides space for the arrangement of a supply container beneath the hollow body, preferably such that the outlet port of hollow body and the supply inlet of the supply container may easily be connected to each other. If outlet port and supply inlet are arranged above each other, transfer of particulate material from the main loading unit to the supply container occurs by gravitational force when the connection between the main loading unit and the supply container is in an open state. The support structure may also provide space for the provision or attachment of further elements of the main loading unit or of the system, respectively. Such further elements may for example be a control unit or a pump, such as a vacuum pump for supporting the transfer of particulate material from an external reservoir into the hollow body of the main loading unit.

[0032] Preferably, the main loading unit comprises at least one of a pump for supporting the filling of the hollow body with particulate material from an external reservoir, a flow meter and a filling level sensor.

[0033] According to another aspect of the invention there is provided a supply container for use in a system for transferring particulate material to a filter making apparatus, preferably for use in the system according to the invention and as described herein. The supply container comprises a closable supply inlet for receiving particulate material. Preferably, the closable supply inlet is connectable to a closable outlet port of a main loading unit and is adapted for receiving particulate material from the main loading unit. The supply container further comprises a closable supply outlet adapted for supplying particulate material from the supply container to a filter making apparatus. Preferably, the closable supply inlet is arranged in a top wall of the supply container and the closable supply outlet is arranged in a bottom wall of the supply container.

[0034] According to an aspect of the supply container according to the invention, the supply container comprises a plurality of closable supply outlets adapted for supplying particulate material from the supply container to a plurality of filter making apparatuses. Preferably, each of the closable supply outlets of the plurality of closable supply outlets is connectable to one filter making apparatus of the plurality of filter making apparatuses. Preferably, the plurality of closable supply outlets is arranged on a lower side of the supply container, preferably in a bottom wall of the supply container. However, only some of the plurality of closable supply outlets may be arranged in the bottom wall of the supply container.

[0035] Aspects and advantages of the supply container have been described above with reference to the system according to the invention and will therefore not be repeated.

[0036] According to another aspect of the supply container according to the invention, the supply container further comprises at least one pressure compensation opening arranged in at least one wall of the supply container. Preferably, an air filter for preventing the inadvertent loss of particulate material is arranged in the at least one pressure compensation opening.

[0037] The provision of a pressure compensation opening provided with a filter filtering particulate material may facilitate filling of the supply container and emptying of the supply container. Especially, it may facilitate a filling and emptying of an otherwise closed supply container. For example during supply of particulate material to one or several filter making apparatuses, pressure balance may be achieved through one or several pressure compensation openings. The filters provided in the openings prevent particulate material to leave the supply container or prevent particulate material from being contaminated from outside of the supply container. Where the at least one pressure compensation opening is arranged in a side wall of the supply container the opening allows direct view into the container and of its filling level. A pressure compensation opening may also be provided in another wall than a side wall of a supply container. Preferably, a pressure compensation opening is closeable such that the pressure compensation opening can be opened when needed but can remain otherwise closed during operation of the system according to the invention. For example, the pressure compensation opening may be opened for filling or emptying of the supply container. A preferably closable pressure compensation opening may also be provided in the main loading unit.

[0038] According to the invention there is also provided a method for transferring particulate material to a filter making apparatus. The method comprises the steps of filling a main loading unit with particulate material, transferring particulate material to a supply container, which is preferably connected to the main loading unit and arranged below the main loading unit. A further step comprises supplying the particulate material from the supply container to the filter making apparatus.

[0039] Preferably, the method comprises the further steps of disconnecting the supply container from the main loading unit after particulate material has been transferred from the main loading unit to the supply container, transporting the supply container to a filter making apparatus, and connecting the supply container to the filter making apparatus.

[0040] With a connection provided between main loading unit and supply container, a secure transfer of particulate material from the main loading unit to the supply container is supported. Advantageously, the connection is designed in a manner such that no particulate material may leave the system through the connection, thus assuring that the system according to the invention remains closed.

[0041] According to an aspect of the method according to the invention, the method further comprises the step of maintaining a fluid connection between main loading unit and supply container closed during filling of the main loading unit. By this, the filling process of the main loading unit and the transfer of particulate material to a filter making apparatus or a supply container may be kept separate. This may provide a better control of individual process steps.

[0042] According to another aspect of the method according to the invention, the method further comprises the steps of connecting the supply container to a plurality of filter making apparatuses and supplying the particulate material from the supply container to the plurality of the filter making apparatuses.

[0043] According to a further aspect of the method according to the invention, the step of filling a main loading unit with particulate material comprises filling the main loading unit from an external reservoir, such as a centralized reservoir or an individual receptacle of particulate material. A centralized reservoir may be connected to the main loading unit for example by a tube system. Upon loading of the main loading unit, a pump system may be activated and particulate material may be transferred from the external centralized reservoir to the main loading unit with support of the pump. Generally, a centralized reservoir may be a large storage room capable of holding several tons of particulate material. An individual receptacle of particulate material typically is a bag with a capacity of preferably between 50kg to 1000kg of particulate material, more preferably between 200kg and 800kg, for example 500kg of particulate material. A main loading unit preferably holds an amount of particulate material for the provision of particulate material to one or several filter making apparatuses for one or several weeks up to several months. For example, a main loading unit has a capacity in a range of between 50kg and 500kg, more preferably in a range of between 100kg and 300kg, for example 250kg. Preferably, the capacity of a supply unit is adapted to a required daily amount of particulate material, adapted to an amount to last for several days or to last up to one week. Preferably, the capacity of a main loading unit and of a supply container may be adapted to a user's need. For example, such a capacity may also be influenced by the availability of an external reservoir, by the surface space conditions at a facility, by the length of a production run or by combinations of these factors.

[0044] Preferably, the particulate material is carbonaceous particulate material, for example charcoal for use in the production of filter elements for smoking articles.

[0045] Further aspects and advantages of the method have been described referring to the system, the main loading unit and the supply container according to the invention and will therefore not be repeated.

[0046] Method steps, especially a transfer of a supply container from a filter making apparatus to the main loading unit, the filling of the supply container at the location of the main loading unit and the transfer of the supply container back to the same or to a different filter making apparatus may be repeated.

[0047] The invention is further described with regard to an embodiment, which is illustrated by means of the following drawings, wherein

Figs. 1 to 3 show schematic views of an embodiment of the system according to the invention and different method steps; wherein Fig. 1 shows the empty system; Fig. 2 shows the system with filled main loading unit and Fig. 3 shows the system with particulate material transferred to a supply container;

Fig. 4 shows an embodiment of a portable supply container for use in a system for transferring particulate material to a filter making apparatus.

[0048] In Fig. 1, Fig. 2 and Fig. 3 a system and method for transferring particulate material to a filter making apparatus (not shown) is shown before filling the system with particulate material (Fig. 1) and during two filling steps (Fig. 2 and Fig. 3).

[0049] Fig. 1 shows a rack 3, wherein a main loading unit 1 is mounted at an elevated level. The rack 3 is provided with appropriate support bars 30. A space 31 is provided in a lower portion of the rack 3, below the main loading unit. A supply container 2 is arranged in the space 31.

[0050] The main loading unit 1 has a hollow body 10 with a funnel-like lower portion 17 ending in an outlet port 13. Outlet port 13 is arranged at the lowermost end of hollow body 10. Two inlet ports 11,12 are arranged in an upper portion of the main loading unit 1. The main loading unit further comprises an upper filling level sensor 14 and a lower filling level sensor 15. The upper filling level sensor 14 is arranged in the hollow body 10 slightly below the inlet port 11 or the opening, where particulate material enters the hollow body, respectively. The lower filling level sensor 15 is arranged at the lower end of the tapered portion of the funnel-like lower portion 17. Filling level sensors may be provided with indicators, for example indicator lamps. Indicators may indicate a predetermined, for example maximum or minimum filling level of the hollow body 10, a falling below, an exceeding or a reaching of such a level.

[0051] A valve 16 is arranged upstream of the outlet port 13 in a lower part of the funnel-like portion 17 of the hollow body 10. The amount of particulate material that is transferred to the outlet port 13 may be controlled by valve 16.

[0052] The supply container 2 is provided with a closable supply inlet 20 and two closable supply outlets 21,22. Supply inlet 20 is arranged in the top wall of the supply container 2. Supply outlets 21,22 are arranged in the lowermost part of a tapered lower portion 26 of the supply container 2. Supply outlets 21,22 direct radially away from the supply container. Supply container 2 is provided with a support frame 23. Support frame 23 allows a secure positioning and good stability of the supply container 2. In addition, support fame 23 may support the lifting of supply container 2 for transport, for example to the location of a filter making apparatus, which location may be remote from the location of the main loading unit.

[0053] Two operation indicators 40,41, for example lamps, are provided, for example fixed to rack 3. An upper operation indicator 40 may indicate that the loading process of the main loading unit is ongoing or completed (as shown in Fig. 2). The lower operation indicator 41 may indicate the transfer or completion of transfer of particulate material into supply container 2 (as shown in Fig. 3).

[0054] The main loading unit 1 may be filled with particulate material 5 through inlet port 11 or 12 or through both inlets. Inlet port 11 may be connected, for example with a tube, to a centralized reservoir (not shown). Such a centralized reservoir may contain particulate material to last for several months or up to a year or for example also for several applications, different from the supply into filters or filter elements for smoking articles. The filling of main loading unit 1 is supported by suction that is applied through the main loading unit, for example through valve 16 or a separate exit (not shown). For that purpose, a pump (not shown) may be attached removably to valve 16 to draw particulate material into the inlet ports 11,12. A filter (not shown) for the particulate material is provided to prevent the particulate material from entering the pump.

[0055] Inlet port 12 may also be an inlet for a manual filling of the main loading unit 1. More than one inlet ports may be provided to load different particulate materials into the main loading unit. By this a particulate material mixture, for example only partly containing carbonaceous material or containing flavor carrying and non-flavour carrying material may be prepared and mixed in the main loading unit 1. For reasons of simplicity only one inlet port 11 is shown in the following.

[0056] In Fig. 2 valve 16 is closed and main loading unit has been filled with particulate material 5. Operation indicator lamp 40 indicating the loading of the main loading unit is in an indicating state. Operation indicator 41 is in a non-indicating state, indicating that no particulate material is being transferred to the supply container (which may for example be linked to the status of a closed valve 16).

[0057] In Fig. 2 upper filling level sensor 14 indicates that a maximum filling level has been reached. The system is now ready for transferring particulate material from the main loading unit 1 to the supply container 2. In operation, upon transfer of particulate material into supply container 2, inlet supply 20 is connected to outlet port 13. Preferably, a connection is designed in an air-tight manner or at least in a manner to prevent particulate material 5 to escape while being transferred into supply container 2.

[0058] Valve 16 is then opened and as shown in Fig. 3, operation indicator 40 has been switched to a non-indicating state while operation indicator 41 is in an indi-

cating state. In Fig.3 particulate material 5 has been transferred to supply container 2. Preferably by valve 16, by lower filling level indicator 15 or by a flow meter arranged in the lower portion of the main loading unit 1 the amount being transferred to supply container 2 is controlled or determined. When the container 2 is filled and ready to be moved to its final destination, a cover (not shown) may be manually applied in order to avoid material to be dispersed from above. The cover may be for example, a lid, a plug or a valve.

[0059] Lower filling level 15 indicates an empty main loading unit 1. Such a signal may either automatically or manually be used as indication to start a loading process of the main loading unit. Preferably, the main loading unit holds particulate material that suffices to fill several supply containers.

[0060] Preferably, the system is controlled by a control unit (not shown), which also receives information from the components, especially from the sensors, provided in the system. By this, a control of a filling status and a loading or transfer of particulate material may be performed automatically. In addition, by a control unit also a survey of an accurate and smooth operation of the system may be performed automatically.

[0061] In **Fig. 4** a supply container 2, for example at the location of a filter making apparatus is shown. Supply container 2 is preferably arranged on a movable support (not shown) such as, for example, a pallet. The pallet may be used for transfer of the supply container 2, for example by a fork lift truck, for example from a filter making apparatus to the main loading unit and vice versa. Supply container 2 has two supply outlets 21,22, which are arranged at the bottom end of supply container 2. Preferably, the particulate material is transported from the supply container 2 to a filter making apparatus (not shown) by suction provided by the filter maker apparatus. The two supply outlets 21, 22 direct in opposite radial directions. Supply outlet 21 may be connected to a hose leading for example to the filter making apparatus and supplying particulate material from the supply container 2 trough said hose to the apparatus. Upon need supply outlet 22 may be connected to another hose leading to another filter making apparatus.

[0062] Supply container 2 has two upper and lower viewing window 25a and 25b arranged in a side wall of supply container 2. Through the viewing windows, a direct view to the inside of the supply container is provided. This allows a visual control of the filling level or also of the condition of the particulate material in the supply container 2.

[0063] The container 2 also has a lower funnel-like part 26 for collecting material 5 and guiding the particulate material towards the outlets 21, 22. A pressure compensation opening 24 is arranged in the upper part of the container 2. A particulate material filter is arranged in the pressure compensation opening 24 such that no particulate material may leave the supply container 2 through said opening 24. The opening 24 may be provided with a cover 28, closing the pressure compensation opening 24 when not needed, for example when not filling or emptying the supply container 2.

[0064] The invention has been described with reference to the embodiment shown in the drawings. However, further embodiments and variations may be envisaged without departing from the scope of the invention. By way of example only, the number and locations of outlet supplies or the provision and location of viewing windows in a unit or container or pressure compensation openings may be varied. Also other arrangements of connections between main loading unit and supply container other than by a vertical tube connection may be provided.

Claims

1. System for transferring particulate material to a filter making apparatus, the system comprising:

   - a main loading unit comprising a hollow body with an inlet port connectable to an external reservoir of particulate material for the transfer of particulate material from the external reservoir of particulate material through the inlet port into the hollow body, the hollow body further comprising a closable outlet port;
   - a supply container comprising a closable supply inlet connectable to the closable outlet port of the hollow body for receiving particulate material from the main loading unit, the supply container further comprising a closable supply outlet;
   - a filter making apparatus connectable to the closable supply outlet of the supply container for receiving particulate material from the supply container.

2. System according to claim 1, further comprising a valve arranged at the closable outlet port of the hollow body of the main loading unit, wherein the valve is adapted to provide an open or closed fluid connection between the hollow body and the supply container, when main loading unit and supply container are connected to each other.

3. System according to any one of the preceding claims, further comprising one of a valve, a filling level sensor, a pump and a control unit for controlling at least one of the valve, the filling level sensor and the pump.

4. System according to any one of the preceding claims, further comprising a transport device for transporting the supply container from a location of the main loading unit to a location of the filter making apparatus.

5. System according to any one of the preceding claims, comprising a plurality of filter making apparatuses and comprising a distribution element arranged between the plurality of filter making apparatuses and the supply container for distributing particulate material from the supply container to the plurality of filter making apparatuses.

6. Main loading unit for use in a system for transferring particulate material to a filter making apparatus, the main loading unit comprising a hollow body with an inlet port arranged at an upper end of the hollow body, the inlet port connectable to an external reservoir of particulate material for the transfer of particulate material from the external reservoir of particulate material through the inlet port into the hollow body, the hollow body further comprising a closable outlet port arranged at a lower end of the hollow body.

7. Main loading unit according to claim 6, further comprising a support structure, wherein the hollow body of the main loading unit is mounted at an elevated level in the support structure and such that the closable outlet port faces downwardly, the support structure further providing a space within the support structure and beneath the hollow body for receiving a supply container arrangeable below the closable outlet port of the hollow body.

8. Main loading unit according to any one of claims 6 or 7, further comprising at least one of a pump for supporting the filling of the hollow body with particulate material from an external reservoir, a flow meter and a filling level sensor.

9. Supply container for use in a system for transferring particulate material to a filter making apparatus, comprising a closable supply inlet for receiving particulate material, further comprising a closable supply outlet adapted for supplying particulate material from the supply container to a filter making apparatus.

10. Supply container according to claim 9, comprising a plurality of closable supply outlets adapted for supplying particulate material from the supply container to a plurality of filter making apparatuses.

11. Supply container according to any one of claims 9 or 10, further comprising at least one pressure compensation opening arranged in at least one wall of the supply container, wherein a filter for filtering particulate material is arranged in the at least one pressure compensation opening.

12. Method for transferring particulate material to a filter making apparatus, the method comprising the steps of:

- filling a main loading unit with particulate material;
- transferring particulate material from the main loading unit to a supply container;
- supplying the particulate material from the supply container to the filter making apparatus.

13. Method according to claim 12, further comprising the steps of maintaining a fluid connection between main loading unit and supply container closed during filling of the main loading unit.

14. Method according to claims 12 or 13, further comprising the steps of connecting the supply container to a plurality of filter making apparatuses and supplying the particulate material from the supply container to the plurality of the filter making apparatuses.

15. Method according to any one of claims 12 to 14, wherein the particulate material is carbonaceous particulate material, for example charcoal for use in the production of filter elements for smoking articles.

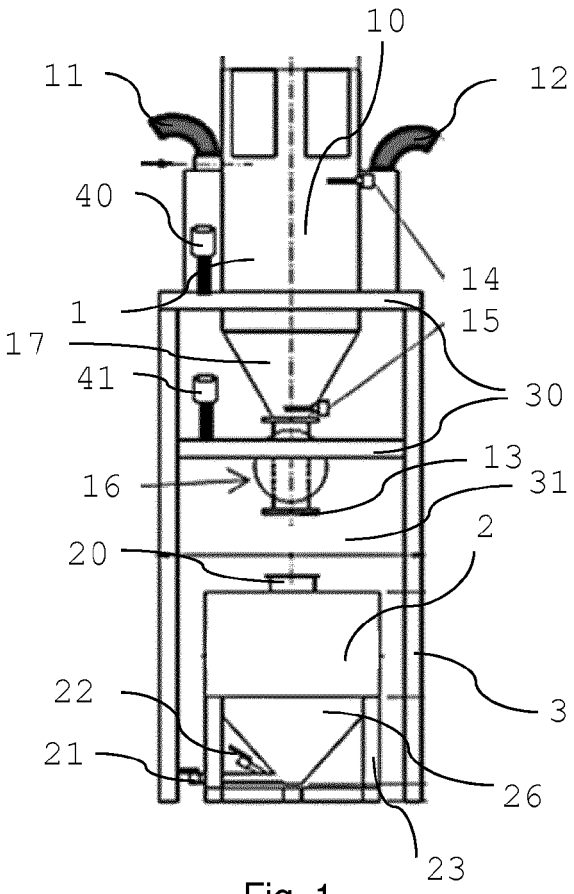

Fig. 1

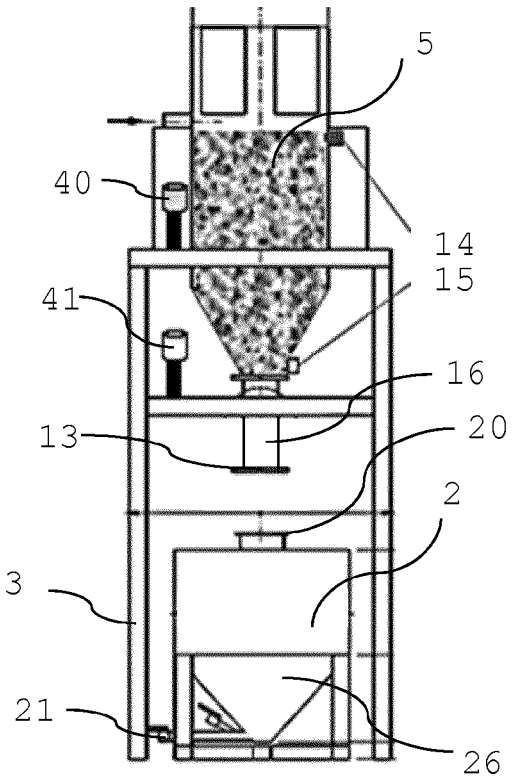

Fig. 2

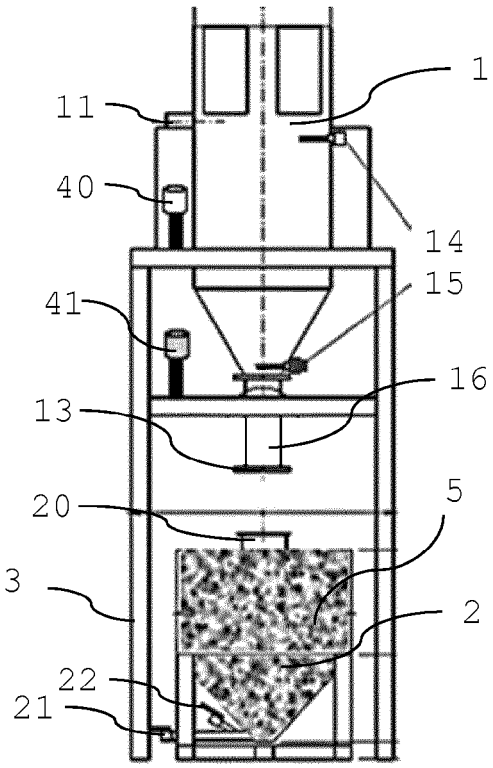

Fig. 3

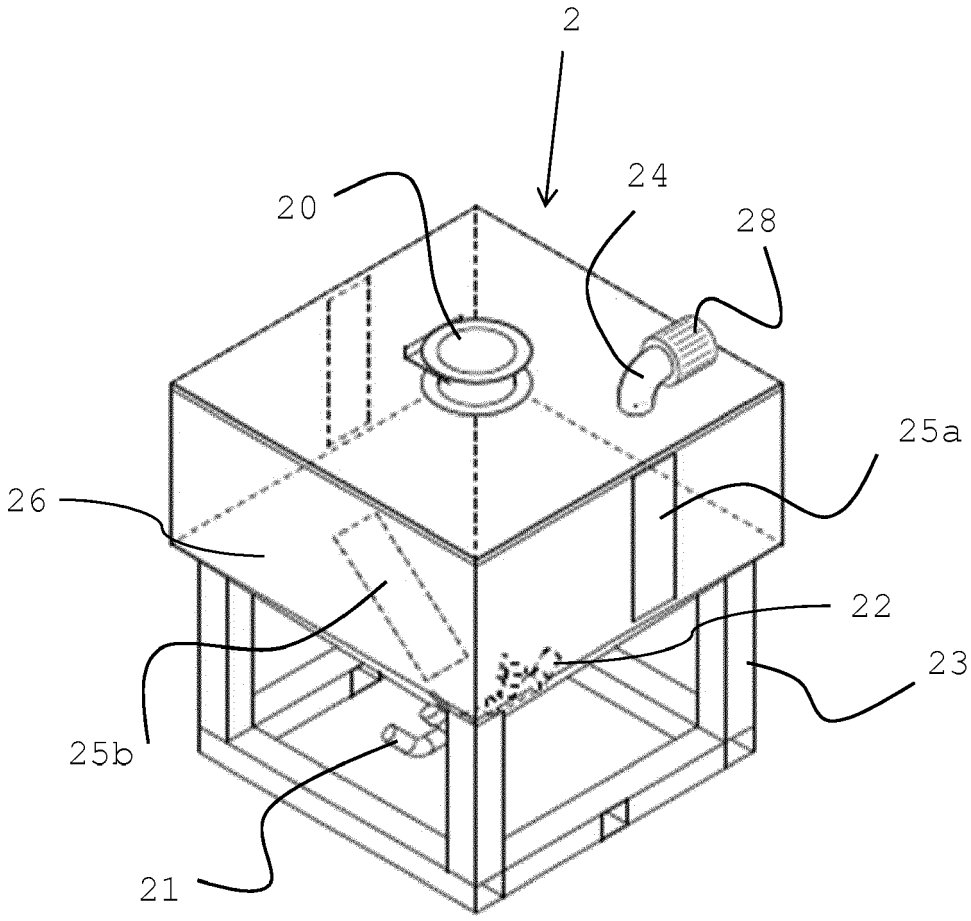

Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 13 18 0347

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 22 54 470 A1 (BURRUS & CIE) 7 June 1973 (1973-06-07) * page 4, line 6 - page 11, line 23; figures 1-4 *	1-3	INV. B65D88/32 A24D3/02 B65D88/68 B65D88/70
X	EP 2 342 982 A1 (HAUNI MASCHINENBAU AG [DE]) 13 July 2011 (2011-07-13) * paragraph [0030] - paragraph [0061]; figures 1-4 *	1-3	
X	WO 2011/033121 A1 (BRITISH AMERICAN TOBACCO CO [GB]; KALJURA KARL [GB]; DAVIS ANDREW [GB]) 24 March 2011 (2011-03-24) * page 3, line 1 - page 8, line 27; figures 1,2 *	1	
X	US 6 537 186 B1 (VELUZ SERGE [CH]) 25 March 2003 (2003-03-25) * sentence 62, paragraph 2 - sentence 23, paragraph 5; figure 2 *	1	

TECHNICAL FIELDS SEARCHED (IPC)
B65D
A24D

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
Munich	17 March 2014	Lämmel, Gunnar

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

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Application Number
EP 13 18 0347

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-3

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 13 18 0347

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-3

   Valve

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2. claim: 4

   Transport device

   ---

3. claims: 5, 9, 10, 14

   Distribution element

   ---

4. claims: 6, 7

   Support structure

   ---

5. claims: 8, 12, 13, 15

   Pump

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6. claim: 11

   Filter

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 13 18 0347

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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17-03-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 2254470 A1	07-06-1973	AT 318457 B	25-10-1974
		CA 977643 A1	11-11-1975
		CH 549964 A	14-06-1974
		CS 204972 B2	30-04-1981
		DE 2254470 A1	07-06-1973
		FR 2162891 A5	20-07-1973
		GB 1407061 A	24-09-1975
		IT 980975 B	10-10-1974
		JP S506560 B2	14-03-1975
		JP S4856898 A	09-08-1973
		NL 7215008 A	14-05-1973
		SE 389005 B	25-10-1976
EP 2342982 A1	13-07-2011	CN 102125302 A	20-07-2011
		DE 102010000680 A1	07-07-2011
		EP 2342982 A1	13-07-2011
WO 2011033121 A1	24-03-2011	TW 201130432 A	16-09-2011
		WO 2011033121 A1	24-03-2011
US 6537186 B1	25-03-2003	NONE	

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