

**Bulk conveying and distribution system, Method for
controlling the same and Pneumatic conveying method**

5 The invention relates to a system and method adapted to
pneumatically convey, by means of a supply equipment, a
flowable bulk material through a duct system to a
selected one of a plurality of distribution sites (bulk
conveying and distribution system and method) and to a
method for controlling such a system.

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In conventional bulk conveying and distribution systems
distribution control valves are provided to control which
distribution duct is selected in each case as the
destination for the bulk material. The distribution
15 control valves have impact surfaces to divert the flow in
the desired flow direction. Such conventional bulk
conveying and distribution systems are shown in figs. 6
and 7. As can be seen from figure 6, a distribution
control valve 101 designed as a three-way valve can be
20 switched to connect a material inlet duct 102 to a
desired one of a plurality of distribution ducts 103. In
the system shown in fig. 7, the distribution control
valves V are realized by two-way directional valves. The
distribution ducts 103 presently not connected are
25 separated from the material inlet duct 102 by means of an
impact surface 104 or by putting two units of two ways
directional valves V at each terminal according to figs.
7A and B. When terminal T3 in fig. 7A require the supply
of material, valve V1, V4 at inlet ducts 102 and V5 at
30 distribution duct 103 will open; according to this
arrangement, flowable bulk material must pass through
valves V1 and V4 before entering into V5. In fig. 7B,
when terminal T2 require the supply of material, valve V1
at inlet duct 102 and valve V3 at distribution duct 103
35 will be open; because of this arrangement, flowable bulk
material must pass through valve V1 before entering into
V3. These resulted in considerable wear and tear of the
valves in the inlet ducts.

The impact surface forces the bulk material to change the flow direction. Since this change of flow direction is effected abruptly, high impact forces are exerted to the impact surface. In consequence, the impact surface and the whole distribution control valve suffer substantial wear and tear. This results in the necessity to frequently replace the distribution control valve and causes high costs. Further, the resistance against the flow of the bulk material is negatively affected by this kind of control valves.

It is an object of the invention to provide a bulk conveying and distribution system in which the installation of control valves in duct portions other than the distribution ducts can be avoided thereby considerably reducing installation costs and the necessity of replacing control valves due to wear and tear.

The bulk conveying and distribution system according to the invention has a supply equipment and a duct system. The duct system comprises at least one distribution terminal (branch point) connected to the supply equipment and a plurality of distribution ducts. Each of the distribution ducts is connected to such a distribution terminal and has an outlet control valve to open and close the distribution duct. The supply equipment is adapted and operable to selectively supply air or the bulk medium into the duct system so as to first fill the duct system with air under a static pressure and establish an air flow route through the duct system and a selected one of the distribution ducts and subsequently establish a flow of bulk medium along said established flow route. The supply equipment is adapted to selectively supply air or bulk material into the duct system.

The invention avoids the installation of control valves on all intermediate ducts (25) of the duct system, thus the bulk medium requires to pass through the intermediate ducts, the selected distribution duct and the outlet control valve thereof into the selected receiver. Thus the problems related to wear and tear of distribution valves installed at intermediate ducts as known by the prior art duct systems (compare Fig. 5 with Figs. 6 and 7) are avoided.

Bulk medium in the sense of the invention either means a pure flowable bulk material or, preferably, a flowable mixture of bulk material and air fluidizing the bulk material.

The bulk conveying and distribution system according to the invention can be operated as follows: To convey bulk material to a desired one of the distribution ducts, the respective outlet control valve of this desired one of the distribution ducts is opened whereas the other distribution ducts are closed. Then the supply equipment is started to supply air into the duct system. The air flow establishes a pressure increase in the duct system up to the closed outlet control valves. Only at that outlet control valve which is open the pressure be the lowest. Hence, an air flow route from the supply equipment to that distribution duct which is open by the open outlet control valve is established for the air flow. At the same time the supply of pressurized air into the duct system results in establishing cushionings of pressurized air in those parts of the duct system which do not belong to that air flow route.

Only after the air flow has established an air flow route through the duct system, bulk medium is introduced into the duct system. Once bulk medium flows through the duct system, the air cushions serve to change the flow direction of the bulk medium flow at branch points or

distribution terminals of the duct system. At the branch points the air cushions in the branch ducts not belonging to the flow route avoid the bulk medium from flowing into these branch ducts even when the direction of the flow route is changing at these branch points.

Thus, neither a distribution control valve nor an impact surface is required for changing the flow direction and establishing a desired flow route. The hydraulic hammering impacts on impact surfaces are avoided. The problems related to wear and tear of the distribution control valves and impact surfaces are eliminated. The resistance against flowing of the bulk material along the preselected flow route is substantially decreased. Further, when automatic control is required, the conventional control valves designed with impact surfaces necessarily must use an actuator to produce the required torque to rotate this impact surface; thus extra components and energy are required. At the same time, the tiny dry bulk material always accumulated at the moving elements of the conventional control valves and jammed the moving elements leading to malfunction of the control valves. According to the invention, where impact surfaces at control valves are avoided as far as possible, also those jamming problems inherent to impact surfaces are avoided.

According to the invention it is possible that the duct system has only one distribution terminal with one inlet branch and two outlet branches and has two distribution ducts connected to the distribution terminal. It is also possible that the distribution terminal has more than two outlet branches and more than two distribution ducts are connected to the distribution terminal. However, it is also possible that the duct system has more than one distribution terminal. In this case different distribution terminals can be connected to each other by intermediate ducts. All ducts extending from one of the

distribution terminals to a destination site, where material is to be conveyed to, are distribution ducts in the sense of the claim wording.

- 5 According to the invention the duct system can e.g. be formed by pipes and/or hoses (stiff and/or flexible ducts). Pipes can be of any shape, e.g. straight and/or bent. The pipes/hoses can have any length. The duct system can e.g. be arranged vertically, horizontally or
10 inclined at any angles.

- The distribution terminal may have any number of outlets and may be of any design, e.g. T-shaped, Y-shaped, Elbow-shaped or Cross-shaped. The outlets can also be of single
15 or multiple layers, and can comprise a single piece or be in modular design in any number of combinations.

- The outlet control valve can be formed integrated in the distribution duct or can be formed as a separate part
20 connected to the distribution duct.

- The outlet control valves can be adapted to be manually or automatically actuated. The control valves can e.g. be adapted to be actuated pneumatically, hydraulically,
25 electrically, mechanically or by any appropriate combination thereof.

- According to the invention it is possible that, at one or more positions, the outlet control valve or the complete
30 distribution duct equipped with an outlet control valve is replaced by a stopper adapted to seal the free end of that distribution duct or the branch of the distribution terminal. Such, a modification of the pipework of the duct system can be carried out. After replacing the
35 outlet control valve by a stopper, the particular distribution duct can no longer be used for the distribution, but all other distribution ducts can further be used for distribution. The stopper acts in the

same way as a closed outlet control valve does. In the meantime the replaced outlet control valve can be inserted into the duct system at a different place.

- 5 Receiver units can be installed at the free ends of the distribution ducts. Such a receiver unit can e.g. be a storage tank, a silo, a mixer, a distribution unit, a transfer device. Receivers can be equipped with de-dusting devices to allow only clean air to escape to the
10 atmosphere.

According to the invention it is possible that the bulk conveying and distribution system is, e.g., adapted to be operated manually and with any appropriate operation
15 sequence.

Preferably the bulk conveying and distribution system has a supply controller which controls the supply equipment such that, each time the outlet control valve of one of
20 the distribution ducts is opened, first air is pumped into the duct system until a air cushioning of pressurized air is established in those parts of the duct system which do not connect the supply equipment to the opened outlet control valve; then bulk medium is
25 introduced into the duct system.

Providing the supply controller has the result that the system according to the invention is as convenient with respect to its operation as a conventional system having
30 an automatic valve control.

Preferably, in the bulk conveying and distribution system, the distribution terminal is free of an impact surface control valve.

35 According to the invention it is possible that the bulk conveying and distribution system is designed such that only one outlet control valve can be open at a time to

prevent segregation of bulk material if the bulk material is in a form of dry mixture such as dry mortar. However, according to the invention, the system can also be designed such that more than one outlet control valves
5 can be open at a time to provide for the simultaneous conveying of bulk medium to two different distribution ducts.

Preferably, the bulk conveying and distribution system
10 has an outlet control valve controller controlling the outlet control valves such that only one outlet control valve is open at a time.

In this case it is further preferred to employ an outlet
15 control valve controller which, upon the request for material from more than one receiver or destination site, automatically chooses one of the receivers and opens the outlet control valve corresponding to that receiver. Choosing one of the receivers can e.g. be carried out on
20 a first come first serve basis. One by one all receivers requesting for material can be filled up until they reach their pre-set maximum level.

According to the invention the supply equipment can be
25 adapted by any appropriate means to selectively supply air or bulk medium into the duct system. By 'supply equipment' is meant any equipment adapted to supply pressurized air into the duct system and to introduce flowable bulk material into the air flowing into or in
30 the duct system. Accordingly, the supply equipment is equipped with supplying means for supplying pressurized air into the duct system. The supplying means is any means capable to provide the supply of pressurized air to meet the operation requirement, e.g. any appropriate pump
35 or compressor or air blower or even an appropriate accumulator or pressurized air or any appropriate combination thereof. Further, the supply equipment is equipped with an introducing means for introducing

flowable bulk material into the duct system. The introducing means is any means capable to introduce flowable bulk material from a main storage container into the air flowing into or in the duct system, e.g. may be a conveyor or even a valve for selectively passing the bulk material under gravity forces out of a container or hopper into the flowing air. Even an appropriate kind of jet pump supplying the pressurized air may be used to suck-in and fluidize the introduced bulk material.

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The supplying means and the introducing means may be combined in a single supply unit or may be constructed as separate devices at different locations.

15 Preferably the supply equipment is equipped with a material feed valve which can be opened to feed bulk material from a material container or hopper into the flow of pressurized air, the supply equipment being adapted to get the fed bulk material fluidized in the
20 supplied air and to supply the fluidized bulk material i.e. the flowable bulk medium formed thereby into the duct system. Once the bulk material is introduced into the duct system, it will mix with the flowing air inside the duct system and fluidization is achieved. Thus, the
25 bulk material becomes flowable bulk medium and follows the flowing air to the desired outlet.

The bulk material can be introduced into the duct system from any appropriate location of the duct system.

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The method according to the invention of controlling a bulk distribution and conveying system having a supply equipment for pneumatically conveying bulk medium and a duct system with a plurality of distribution ducts
35 equipped with outlet control valves, the supply equipment having introducing means for introducing flowable bulk material into the duct system and having supplying means for supplying pressurized air into the duct system,

comprises the following steps:

When bulk material is required at one of the receivers, the outlet control valve of that one receiver will be
5 opened; then, air is supplied into the duct system until air cushioning is established at those parts of the duct system where outlet control valves do not open.

Once the air cushioning effect had been established
10 inside the duct system, a steady air flow route from the air supplying means of the supply equipment to the selected receiver where the outlet control valve has been opened will be established.

15 Once the steady air flow route had been established, the material feed valve of the dry bulk material will be opened to introduce dry bulk material into the duct system. Once the dry bulk material entered into the duct system, the supply air inside the duct system will carry
20 the dry bulk material inside the duct system via the air flow route that had been established to the selected receiver.

When the bulk material inside that selected receiver had
25 reached the pre-set maximum value, the material feed valve of the introducing means of the supply equipment of the bulk material will be closed to stop the feeding of bulk material into the duct system.

30 After the material feed valve of the bulk material had been closed, the feeding of bulk material into the duct system will stop. However, the air will continue to be supplied into the duct system to assure that bulk material inside the duct system has been carried as
35 completely as possible to that selected receiver.

Once the bulk material inside the duct system had been cleared to the acceptable extent, the supplying of air

into the duct system is stopped by closing the respective air supplying means of the supply equipment. Once the air supply had been stopped, the outlet control valve of that selected receiver will be closed and the conveying cycle
5 for that selected receiver is considered completed.

For continuing with a new conveying cycle, another outlet control valve of the next-selected receiver is opened and the conveying cycle is started again by opening the air
10 supplying means of the supply equipment to provide for establishing a new air flow route through the duct system to that next-selected receiver, while establishing the cushioning effect in any duct sections of the duct system branching off from the new air flow route.

15 Though it is possible to start air supply into the duct system when all outlet control valves are closed in order to first fill the duct system with pressurized air before establishing a selected air flow route by opening the
20 outlet control valve of a selected receiver, we currently prefer to open the outlet control valve of the selected receiver before starting with air supplying to avoid overpressure in the duct system and sudden relieve of this pressure when opening the selected outlet control
25 valve.

When introducing the bulk material into the duct system by the introducing means of the supply equipment, it is preferred to further support flowability the bulk
30 material with the flowing air at the introducing location of the duct by fluidization of the bulk material when being introduced into the flowing air. Accordingly, the introducing means should be adapted to control the feed rate of the bulk material being introduced for proper
35 fluidization of the bulk material to be established.

Preferred embodiments of the invention are described with

reference to the drawings. In the drawings:

Figure 1 shows a schematic view of the duct system of the bulk conveying and distribution system according to a
5 first embodiment of the invention;

Figure 2 shows a schematic view of the duct system of the bulk conveying and distribution system according to a
10 second embodiment of the invention;

Figure 3 shows a schematic view of the duct system of the bulk conveying and distribution system according to a
15 third embodiment of the invention, wherein the operation of the system in the period of air pumping is indicated;

Figure 4 shows a schematic view of the duct system of the bulk conveying and distribution system of Fig. 3, wherein
20 the operation of the system in the period of material pumping is indicated;

Figure 5 shows the embodiment of Fig. 3 with a
modification of the supply of bulk material and air; and

Figures 6 and 7A, 7B show prior art bulk conveying and
25 distribution systems with three-way control valves at branching points of distribution ducts from intermediate ducts in Fig. 6 and two-way directional control valves of intermediate ducts and distribution ducts of the duct system in Figs. 7A and 7B.

30 From Fig. 1 a duct system 2 can be seen having five distribution ducts 22 and six distribution terminals 21 each being designed as a two-way distributor having one inlet branch and two outlet branches. Each of the
35 distribution terminals 21 is T-shaped.

The distribution terminals 21 are arranged as follows.
The first T-shaped distribution terminal 21 is arranged

such that the T-crossbar extends vertically. Towards the bottom direction the first distribution terminal 21 is connected via a vertically extending intermediate duct 25 to the supply equipment 1. Towards the top direction the first distribution terminal 21 is connected via another vertically extending intermediate duct 25 to the second distribution terminal 21 also formed by a T-piece with a vertically extending T-crossbar. Further to the top the third, the forth, the fifth and the sixth distribution terminal 21 follow in the same way each connected via another vertically extending intermediate pipe 25 to the preceding distribution terminal 21. Thus the distribution terminals 21 and the intermediate ducts 25 form a e.g. vertically extending main supply duct of the duct system 2.

The third end of each of the T-pieces of the first, second, third, forth and fifth distribution terminal extends laterally from the main supply duct. At each of the first, forth and fifth distribution terminal 21 a laterally extending distribution duct 22 is connected to the third end of the T-piece forming the distribution terminal 21 and being arranged with a vertically extending T-crossbar. At each of the second and third distribution terminal 21 a stopper 24 is arranged at the third end of the T-piece to close it.

Unlike the other distribution terminals 21, the sixth distribution terminal 21 also formed by a T-piece is arranged with a horizontally extending T-crossbar. At each of the ends of the T-crossbar a laterally extending distribution duct 22 is connected to the sixth distribution terminal 21.

Each of the five distribution ducts 22 is equipped with an integrated outlet control valve 23. To the free end of each of these five distribution ducts 22 a receiver 6 is connected.

From Fig. 2 a more complex duct system than that of Fig. 1 can be seen. The duct system of Fig. 2 has five distribution terminals 21, two of which being T-shaped, two of which each having one input branch and three output branches and one of which having an input branch and seven output branches. Further the duct system has ten distribution ducts 22 each equipped with an outlet control valve 23 and connected to a receiver 6. Three branches are closed by means of stoppers 24.

From Figs. 3 and 4 a duct system can be seen similar to that of Fig. 1. The duct system has a vertical arrangement of distribution terminals 21 at the positions P, R, U and V. The distribution terminals 21 are connected to each other by means of intermediate ducts 25 establishing a main supply duct. The distribution terminals 21 at the positions P, U and V are formed by T-pieces each having one input branch and two output branches. The distribution terminal 21 at position R is formed by a cross-piece having one input branch and three output branches. To each of the distribution terminals 21 at the positions P, U and V one distribution duct 22 is connected laterally extending from the vertical main supply duct of distribution terminals 21 and intermediate ducts 25. Each of the distribution terminals 21 has an output control valve 23. To the distribution terminal 21 at position R, two distribution ducts 22 are connected each having an output control valve 23 and laterally extending to the positions S and T. To each of the distribution ducts 22 a receiver 6 is connected.

A supply equipment 1 is connected to the duct system 2. The supply equipment 1 is equipped with an air supplying means 11 for supplying air from an air source and a bulk material introducing means 12 e.g. in the design of a controllable material feed valve which can be opened to feed bulk material from a material container or hopper (not shown) in a controlled feed rate into the duct

system, where the bulk material will be fluidized by the air flowing in the duct system. Fluidizing the bulk material results in a flowable bulk medium fed into the main supply duct of the duct system.

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A supply controller 3 is connected via a data line to supply equipment 1. An outlet control valve controller 4 is connected to each of the outlet control valves 23. The outlet control valve controller 4 is adapted to control the outlet control valves 23 such that only one outlet control valve 23 is open at a time.

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The bulk conveying and distribution system shown in Fig. 5 is similar to that in Fig. 3 with a modification of the supply equipment 1. According to Fig. 3, the air supplying means 11 and the bulk material introducing means 12 are designed as separate units, the introducing means 12 opening directly into the main duct of the duct system at a location downstream of the air supplying means 11. In Fig. 5, the supply equipment 1 is shown as combining the air supplying means 11 and the bulk material introducing means 12 in a single supply unit.

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The operation of the bulk conveying and distribution system shown in Figs. 3, 4 and 5 is illustrated with reference to these figures. It should be understood that an important part of the invention is the ESTABLISHMENT OF AIR CUSHIONING EFFECT WITHIN ANY DUCT SYSTEM TO ACHIEVE AUTO TURN of bulk medium flow in the duct system to the desired distribution site. To this end, any appropriate controls can be used. It should also be understood that the disclosed components can be of any appropriate design and any appropriate material can be used for all these components.

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If none of the receivers 6 requires any bulk material the outlet control valve controller 4 automatically holds all the outlet control valves 23 at closed position.

Upon request for material from one of the receivers 6, the outlet control valve controller 4 checks whether the respective outlet control valve 23 can be opened, e.g.
5 the control valve 23 at the position indicated by S.

In the present embodiment, the outlet control valve controller is adapted to allow the supply of material to only one of the receivers 6 at a time. Hence, in a case
10 that more than one receivers 6 require the supply of material at the same time, the outlet control valve controller 4 automatically chooses one of the receivers 6 to be filled. The selection is based on a first come first serve basis. All the receivers are filled up one by
15 one until they reach a pre-set maximum level.

When the receiver 6 at point S requests material and is the first receiver in the queue, the outlet control valve 23 at point S is opened. The supply equipment 1 starts
20 the supplying operation of air supplying means 11. However, the material feed valve 12 is not opened for a preset time. Hence, only air is pumped into the duct system 2. The cavities within the whole duct system 2 are filled with air.

25 Since all the other outlets are sealed, either by a stopper 24 or by a closed outlet control valve 23, the only open outlet of the duct system is that of the receiver 6 at point S. Once the air flow has filled up
30 the cavities before the seals, the air supplied from the supply equipment 1 automatically flows to the receiver at position S, since between the outlet of the supply equipment 1 and the outlet control valve 23 at the position S the highest pressure difference is found.
35 Thus, within the duct system a route of air flow is established starting from the supply equipment 1 and passing points P, R and S, as it is shown by the arrow in Figs. 3 to 5. After a while a steady flow of air along

the established air flow route is established.

At receiver 6 at position S the air escapes to the atmosphere. The receivers 6 are equipped with air filters
5 or other de-dusting devices (not shown) so that only clean air escapes to the atmosphere.

Once the pre-set time period has elapsed, the material feed valve 12 is opened to allow that bulk material (e.g.
10 mixed with air) is introduced into the air flow. the feed rate of bulk material is controlled by material feed valve 12 so as to assure that the fed bulk material becomes fluidized in the air flow thereby forming a flow of bulk medium of bulk material mixed with air. The bulk
15 medium flow follows the established flow route of the air flow, as it is shown by the darkened areas within the duct system and by the arrow in Fig. 4.

The bulk medium flows until reaching the distribution
20 terminal at point R in Fig. 4. Then the bulk medium will not continue to point U or to point T, since between points R and U and R and T, respectively, the duct system has been filled with pressurized air. The formation of this main supply duct of pressurized air, before the
25 material feed valve 12 is opened, automatically creates a cushioning effect on the coming bulk medium flow. This results in a smoothened change of direction of the bulk medium at the distribution terminal at point R. The change of direction (turn) at point R is effected without
30 mechanical impact on any surface.

When the bulk material has reached the maximum preset level inside the receiver 6, the material feed valve 12 will be closed. Hereby, entering of the bulk material
35 into the duct system is stopped. However the air supplying means 11 of supply equipment 1, e.g. a compressor, will continue to supply air into the duct system to clear away any residuals of bulk material that

left inside the duct system.

After the material feed valve 12 had been closed for a certain preset time, the supplying means 11 will also
5 stop supplying of air into the duct system. After the air supplying means have been stopped for a certain preset time, the outlet control valve at the position S will be closed and the conveying cycle of bulk material to the selected receiver 6 at position S is considered
10 completed.



Claims

1. Bulk conveying and distribution system equipped with a duct system (2) for pneumatically conveying and
5 distributing a flowable bulk medium, and with a supply equipment (1) connected to the duct system to convey the bulk medium into and through the duct system, the duct system (2) comprising a plurality of bulk receivers (6) and a plurality of distribution ducts (22) each of said
10 distribution ducts being connected between a distribution terminal (21) of the duct system and one of said bulk receivers (6) and each of the distribution ducts (22) being associated with one of a plurality of outlet control valves (23) for selectively opening or closing
15 said distribution duct, wherein the supply equipment (1) is adapted and operable to supply a flow of pressurized air into the duct system (2) before the bulk medium is supplied into the duct system so as to first fill the duct system with pressurized air and establish an air
20 flow route through the duct system and a selected one of the distribution ducts opened by its associated outlet control valve and subsequently establish a flow of bulk medium along said established flow route.
- 25 2. Bulk conveying and distribution system according to claim 1, comprising a supply controller (3) designed to control the supply equipment (1) for said filling of the duct system with air and said establishing of said air flow route and said flow of bulk medium.
- 30 3. Bulk conveying and distribution system according to claim 1 or 2, comprising an outlet control valve controller (4) controlling the outlet control valves (23) such that only one of the distribution ducts is open at a
35 time.
4. Bulk conveying and distribution system according to one of claims 1 to 3, wherein the supply equipment (1) is





equipped with a bulk material feed valve (12) adapted to be opened for feeding bulk material from a material container into the air flow of the air flow route, the supply equipment being adapted to have fluidized the bulk material fed from said material container in the air flow to form said flowable bulk medium.

5. Bulk conveying and distribution system according to one of claims 1 to 4, wherein the bulk receivers (6) are equipped with de-dusting devices allowing clean air to escape to the atmosphere.

6. Bulk conveying and distribution system according to one of claims 1 to 5, wherein a plurality of said distribution ducts are branched from one distribution terminal (6).

7. Bulk conveying and distribution system according to one of claims 1 to 6 wherein the duct system (2) comprises at least one blind duct section closed by a stopper (24).

8. Method of controlling a bulk distribution and conveying system for pneumatically conveying a flowable bulk material, said bulk distribution and conveying system having a duct system with a plurality of distribution ducts each equipped with an associated outlet control valve to selectively open or close said distribution duct, and having a supply equipment with introducing means for introducing bulk material into the duct system and supplying means for supplying pressurized air into the duct system, comprising the steps of:

operating a selected one of said outlet control valves to open a selected one of the distribution ducts through which the bulk material is to be conveyed when the other ones of the distribution ducts are closed,

operating the supplying means to supply pressurized air into the duct system to establish a cushioning effect of pressurized air in those parts of the duct system which are closed by the closed ones of the distribution ducts





and to establish an air flow route through other parts of the duct system which are opened by the open selected one of the distribution ducts and through said selected one of the distribution ducts, wherein said operating a selected one of said outlet control valves is performed before or after said operating the supplying means is performed, and subsequently operating the introducing means to introduce bulk material into the duct system so as to establish a flow of bulk medium of fluidized bulk material through the other parts of the duct system and said selected one of the distribution ducts along said established air flow route.

9. Method according to claim 8, wherein the introducing means are closed when a predetermined amount of bulk material has been introduced, while continuing to operate the supplying means to continue to supply pressurized air through and along the established air flow route thereby carrying out any remaining bulk material through said selected one of the distribution ducts.

10. Method for pneumatically conveying and distributing a flowable bulk material through a duct system having a plurality of separate distribution ducts leading to separate bulk receivers, comprising the steps of

supplying pressurized air into the duct system and opening a selected one of the distribution ducts thereby establishing an air flow route through parts of the duct system and the selected one of the distribution ducts, while establishing pressurized air cushioning in any parts of the duct system branching off from said air flow route, and

subsequently introducing the flowable bulk material into the air flow route thereby establishing a flow of the bulk material fluidized by the air through and along the established air flow route.

