(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 818 235 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.01.1998 Bulletin 1998/03

(51) Int. Cl.[6]: **B01F 3/18**

(21) Application number: **97202154.7**

(22) Date of filing: **09.07.1997**

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

(30) Priority: **11.07.1996 NL 1003562**

(71) Applicant:
Verstegen Specerijen B.V.
3044 AM Rotterdam (NL)

(72) Inventor: **Driessen, Jan**
3055 WE Rotterdam (NL)

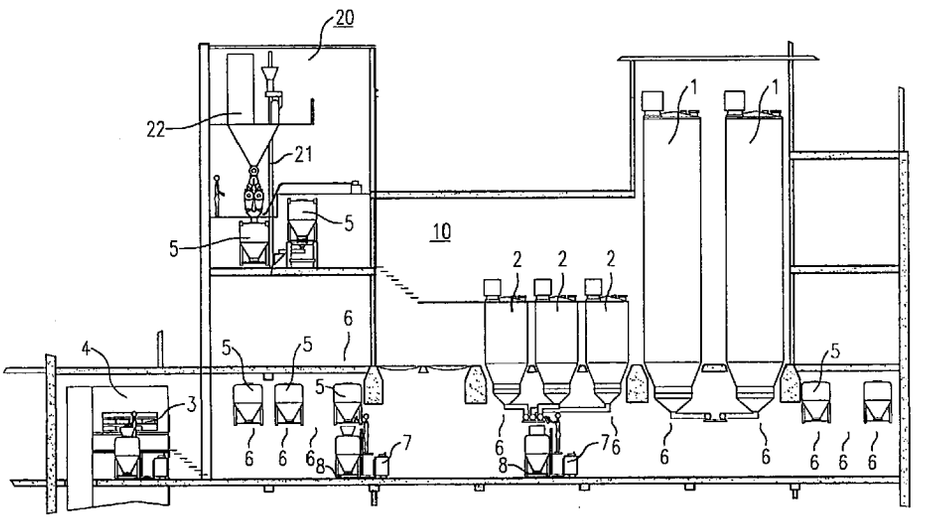
(74) Representative:
Jilderda, Anne Ayolt
Octrooibureau LIOC B.V.
P.O. Box 85096
3508 AB Utrecht (NL)

(54) Method and installation for mixing dry materials herbs and spices in particular

(57) In a method for mixing dry materials, herbs and spices in particular, a mixing vessel (5) is filled with the materials required for a mixture to be prepared. Subsequently, the materials are mixed mechanically in the same mixing vessel (5) and, if required, poured from the same mixing vessel (5) into a final package.

An installation for executing a similar method comprises for each material, at least for most of them, a filling station (6) equipped with means for data transmission to a central processing unit and a memory linked to it, which are associated to the mixing vessel (5) to be filled. In addition, the installation comprises a mixing installation which can mix the substances enclosed by the vessel (5). The mixing installation, too, is equipped with similar means for data transmission.

Fig.1



EP 0 818 235 A2

Description

The present invention concerns a method for processing dry materials, herbs and spices in particular, into a specific mixture which involves filling a mixing vessel with the materials of the mixture, mixing the materials mechanically and, if required, pouring the mixture into a final package. In addition, the invention concerns an installation in which the above-mentioned method is to be executed. For that matter, the invention does not only concern the mixture of either different herbs or different spices, but also the mixture of herbs and spices with each other or with other materials which are usually employed in (large-scale) cooking, such as, for example, salts, sugars or other sweeteners, as well as other ingredients, such as breadcrumbs, starch, colourings, flavourings, aromatic substances, binding agents, etcetera. In particular, the invention concerns mixtures of herbs and/or spices intended for fish and meat products.

In a conventional method and installation for mixing herbs and spices, the materials, in the right proportions, are usually dumped from the original supplier package into a mixing vessel, in which, by means of mechanically driven mixing arms, they are processed into a homogeneous mixture. Subsequently, the mixing vessel is emptied into a suitable container in which the finished product is taken to the packaging section to be dumped into a final filling station. Eventually, from there, a final package is filled with the product.

However, one of the drawbacks of the known method is the fact that, from the initial to the final stage, it involves transferring the product several times. Moreover, in general it lacks a check on the contents and the specific location of the product within the installation. It will be clear that it is absolutely necessary to prevent that the wrong materials end up in a specific mixture to be prepared, which, especially in the case of herbs and spices, which are sometimes highly dominant, can be disastrous.

The present invention is aimed at, among others, providing a method and installation for mixing herbs and spices to which these drawbacks do not, at least only in part, occur.

For that purpose, a method of the type referred to at the beginning is characterised in that the filling, the mixing and, if necessary, the packaging of the mixture are, in different places, performed in(to) and from, respectively, the same mixing vessel. This method involves filling an originally empty mixing vessel with materials in the right proportions, after which the product will not leave the mixing vessel until a final package is filled with it. Transferring the product between this initial and the final stage of the process is thus avoided. For the purpose of mixing the product, a mixing installation is utilised in which the mixing vessel can be received as an exchangeable part and which can process the materials enclosed by the original mixing vessel into a homogeneous mixture. A similar mixing installation is described in detail in a Dutch patent application with number 1003561, filed simultaneously by applicant, the content of which is considered to be included here.

Since normally the materials, after they have been dumped into the mixing vessel, do not leave the mixing vessel until the final stage, an efficient check on the contents of the mixing vessel and its position in the factory is advisable. This need is satisfied by the invention in a special embodiment of the above-mentioned method characterised in that the mixing vessel is equipped with a memory module which can be programmed and read out electronically. In this module information on the contents and the identity of the vessel is stored. All data concerning the contents and the identity of the mixing vessel are stored in the memory module and, if required, can at all times be retrieved. In addition, the identity of the mixing vessel, for example in the form of a serial number, can be visually indicated on the mixing vessel.

According to the invention, a preferred embodiment of the method is characterised in that the mixing vessel is filled on a trolley equipped with an electronic weighing installation as well as an electronic processing unit in order to receive a recipe for a mixture in electronic form, to store it in a memory unit linked to it and to store weight data provided by the weighing installation in the same or another memory unit linked to the processing unit. A similar trolley, for example in the form of a fork-lift truck equipped with a weighing lift fork, offers the option of providing its operator with information concerning the type and amount of materials by way of a display linked to and operated by a processing unit and the option of testing the amount dumped into and weighed in the mixing vessel against the recipe. An additional preferred embodiment of the method is in this respect characterised in that the weight data provided by the weighing installation are also stored in the memory module of the mixing vessel. Preferably, this is effected by means of blank contact data transmission to the memory module of the mixing vessel, so that no manual input whatsoever is required and the process is completely automatic. Moreover, a similar double storage of data with regard to the specific contents of the mixing vessel is, at least for the time during which the mixing vessel stays on the trolley, an additional safeguard against the loss of data, because each memory will always be a reflection of the other.

According to the invention, an installation for executing the above-mentioned method according to the invention is characterised in that for each material, at least for most of them, it contains a filling station equipped with means for data transmission to a central processing unit and a memory linked to it, which are associated to a mixing vessel to be filled, in that it contains a mixing installation which can mix the substances enclosed by the vessel, and in that the above-mentioned mixing installation, too, is equipped with similar

means for data transmission. Within this installation, a mixing vessel is always placed at a purpose-built and, therefore, fixed point in a filling station and mixing installation respectively, so as to realise a situation in which the above-mentioned means are capable of cooperating with the central processing unit and the memory linked to it which are associated to the mixing vessel. A recipe for a mixture which is loaded into the memory can thus function as a touchstone of materials data which are transmitted from the filling station. Furthermore, the central processing unit offers the option of guiding the operator efficiently and, if necessary, via the shortest route along the locations, possibly changing individually, where the specific ingredients of the mixture can be loaded. For this purpose, a display is linked to the central processing unit. This enables particularly strict supervision to be exercised over the contents to be formed in the vessel in order to prevent that the wrong materials end up in it.

According to the invention, in a special embodiment, the installation is characterised in that the central processing unit and the memory are fitted on a trolley on which the mixing vessel is placed, at least when in operation, and in that the trolley is equipped with means for data transmission to the memory module of the mixing vessel. Thus the need for each mixing vessel to be equipped with a central processing unit and a power supply is avoided and similar means will suffice on an, in practice, considerably smaller amount of vehicles used for transporting the vessels within the installation. However, because the mixing vessel, when in operation, will always be transported by means of a similar trolley, and transmission of data between them is possible, an efficient association of the processing unit to the mixing vessel is always existent.

Until the final stage, the mixture is enclosed by the same mixing vessel. Eventually a final package is filled with the product from this mixing vessel. For the purpose of offering an additional check on the contents of the mixing vessel, an additional embodiment of the installation according to the invention is characterised in that a final filling station intended for filling a final package with the contents of the vessel is equipped with means for data transmission to the memory module of the mixing vessel.

Once it has been emptied, the mixing vessel can be cleaned in a washing station equipped for this purpose. This will usually be effected by rinsing the interior of the vessel in particular with water under high pressure. In this respect, the preferred embodiment of the installation according to the invention is characterised in that it contains a washing station in which a mixing vessel is to be cleaned, and in that the washing station is equipped with means for data transmission to the memory module of the mixing vessel. In this case, the data exchange between the tunnel-like washing installation and the mixing vessel offers the option to check that no filled mixing vessels are, unexpectedly, placed in the washing station, which would be disastrous for its contents, and to erase the contents of the memory module on the mixing vessel once it has been cleaned so as to make the mixing vessel available for subsequent use.

In accordance with a special embodiment, the installation according to the invention is characterised in that the filling stations of several of the materials comprise a storage vessel of a design at least nearly identical to the design of a mixing vessel, incorporated in it as an exchangeable part, and in that the filling station comprises means for data transmission to a memory module on the storage vessel. In practice, the use of identical vessels for mixing and keeping a stock of materials results in a highly increased flexibility with regard to the use of vessels. Although the filling stations themselves have fixed locations, by placing different storage vessels in them, the type of material dumped from them can vary. Nevertheless, a fill check on the location and contents of the storage vessels is always performed thanks to the option of data transmission between the memory module of the storage vessel and the means fitted on the filling station for this purpose. This embodiment offers considerable advantages from a logistic point of view and is, owing to the use of a mixing or storage vessel which has been standardised wherever possible, extremely attractive from the view of business economics as well.

The above-mentioned data transmission between individual parts of the installation can, itself, be effected in various ways. The data can, for example, always be entered manually or can be transmitted from one part to the other by means of plug connections, whether or not automatic. However, preferably the installation according to the invention is characterised in that the means for data transmission are always capable of blank contact electronic transmission of the data referred to above. A similar transmission takes place, for example, on the basis of induction or radiographic contact between the parts concerned and has the advantage that their positioning is less critical and, because of this, among others, functioning is more reliable.

The invention will now be explained by means of a sample embodiment and an accompanying drawing, in which:

figure 1 shows a cross-section of a first part of a sample embodiment of an installation according to the invention which comprises a filling section and a milling station;

figure 2 shows a more detailed drawing of the milling station in figure 1;

figure 3 shows a cross-section of one of the mixing stations of the installation in figure 1 and

figure 4 shows a cross-section of a second part of the installation in figure 1, comprising a final filling section.

For that matter, the figures are purely schematic and are not drawn to scale. Notably, for purposes of clarity, some dimensions have been represented in a highly exaggerated manner. Whenever possible, in the figures corresponding parts are indicated with the same reference number.

Figure 1 shows, among others, one of the filling sections of the installation in which the various materials, i.e. herbs, spices, salt, breadcrumbs, etcetera, are kept in stock and from which mixing vessels can be filled with materials in accordance with the specific recipe of the mixture to be formed. In principle, in the filling section no supplier packages are found and, instead, all materials have been transferred in advance. Most materials, such as breadcrumbs, salt, etcetera, are supplied in bulk and are blown, through pipes, directly from the vehicle into silos 1,2, where they are stored. However, materials which are used in very small quantities, such as, for example, saffron, are dumped into bins 3 made from, for example, synthetic materials and are placed in a paternoster lift 4. This is a continuous lift in which the bins rotate. The remaining majority of materials are, in a special transfer section which has not been included in the drawing, transferred from their original supplier packages into a storage vessel 5 the design of which is identical to the design of a mixing vessel in which combined materials are mixed in an installation 30, see figure 3, specially equipped for this purpose. Therefore, the vessels 5 do not have a unique function, but can be put into service, as is desirable, either as a storage vessel or as a mixing vessel, according to the needs at a given moment. The purpose of transferring the materials from their original packages is to prevent that packages, whether or not opened, of different types and sizes are found in the production room.

Every vessel 5 is fitted with a badge, a synthetic cube, which contains a memory module in which data concerning the contents and the identity of the vessel are electronically stored. If a vessel 5 is filled with a particular material, this is entered into a central computer by an operator. The central computer then writes the contents data, i.e. type of material and its weight, to the badge of the vessel 5. Subsequently, the type of the material, in the form of a code number, if required, together with the vessel number and its destination, will appear on a display. The vessel number can also be read from the vessel itself. The reading and writing of the memory module of the vessel always takes place by means of wireless blank contact data transmission, radiographically for example, which makes it easier to position the vessel in front of a read and/or write head and boosts the reliability of the system.

The destination indicates the location where the storage vessel is to go. This may be the milling station 20, in the case of materials which need to be ground first, or vessels may go directly to the filling section 10, where the storage vessel is suspended in a filling station 6 available at that moment or is dumped in a silo 1,2 in the case of materials which are not supplied in bulk. In the milling station 20, which has been drawn in more detail in figure 2, the vessel 5 is coupled to a mill 22 by means of an aeromechanical lifting system 21. The lifting system 21 consists of a supply pipe and a return pipe in which a chain fitted with buckets rotates at high speed, carrying the material along. In the mill 22, the material is ground and led to another, similar mixing vessel through a rotating pressure gate 23 and a sieve 24 of the fineness required. During this process, the parts of the material which are too coarse are led back to the original vessel in order to be offered to the mill again. Usually the density of the material when ground will be higher than its density when not ground, which, as a rule, causes a vessel 5 filled to the brim with ground material to require more than one vessel 5 of unground material. Eventually, once it has been ground, the material will, in the new vessel 5, continue its way in the factory to the filling section 10 in order to be suspended there in one of the available filling stations 6. In order to boost the throughput, the milling station is equipped with a number of similar grinding machines 22 located next to each other, all of which are fitted with a read head positioned opposite the badge of the vessel 5 when the vessel is placed in a rack fitted for this purpose. By means of these heads, information from the badge is read out, comprising, for example, a grinding program containing indications concerning the required rotational speed of the motor, the required injection of liquid nitrogen for the purpose of cooling the material and the required fineness of the sieve, so that the assistance of an operator is hardly, if at all, required.

Each of the filling stations 6 in which storage vessels are suspended in this way is equipped with a rack, which, for that matter, has not been included in the drawing, in which the storage vessel 5 can be placed and which is equipped with means for data transmission to the memory module of the storage vessel 5. These means comprise a read head which is eventually positioned in front of the badge fitted with a memory module of the vessel 5 and which is linked to the central computer of the installation. Both the read head and the badge are fitted with an antenna and electronics for blank contact and wireless data transmission between them. By means of the read head, the data from the badge of the storage vessel can be read out and sent on to the central computer. In this way, central management of the type of material, the filling station 6 where it is suspended and the actual contents of the storage vessels can be effected. A displays of the central computer gives, for example, a quick indication for all racks 6 in the filling section which materials are present and in which quantity.

The mixing process of a new mixture starts with collecting a clean mixing vessel 5 in a purpose-built tunnel-like washing installation in the installation, which, for that matter, has not been included in the drawing. In this installation, after use, vessels are always rinsed with

water under high pressure and, subsequently, dried. The washing station is equipped with means for data transmission to the memory module on the mixing vessel, which, beforehand, is used to read out the memory module. Thus it is checked before the commencement of the washing process whether the vessel is really empty and needs cleaning, in order to prevent the contents of a completely or partly filled vessel from being accidentally put in touch with water. After the washing process, with the same means, the memory module of the vessel is completely erased so as to make the vessel available for reuse.

The clean mixing vessel is collected with a purpose-built trolley, 7, see figure 1, which, too, is equipped with means for data transmission to the memory module of the mixing vessel 5. As soon as the mixing vessel 5 has been placed on the trolley 7, the combined read/write head will read out the content of the memory module of the mixing vessel 5. Should, at the start of a new mixing process, a vessel which has not been cleaned be unintentionally placed on the trolley, then this will immediately be indicated there.

The trolley 7 is equipped with a central electronic processing unit, a microcomputer, which is fitted with a working memory and is linked to the above-mentioned means for data transmission to the mixing vessel as well as with means for data transmission to a central computer in the installation. These latter means, too, provide wireless communication, more specifically by means of an antenna on the trolley and an antenna linked to the central computer and found in various places in the installation. A similar antenna is, for example, present at a central point in the installation where the trolley loads a new recipe from the central computer. On the central computer all recipes can be examined and, if necessary, their order can be changed. A recipe is not sent to a trolley 7 until it has been filly approved. Thus, from the central control room, complete supervision and control of the logistics of the mixing process can be realised.

The recipe thus loaded comprises all data, such as type, weight and location, required for collecting the materials within the factory. As soon as the recipe has been stored in the memory of the trolley, its display will show the name of the first material in the recipe and the filling station where it can be collected. Thus the operator knows exactly what his tasks are.

By means of the trolley 7, the mixing vessel 5 is driven under the rack of the right filling station 6 where the trolley 7 is positioned in front of an antenna linked to the central computer, with which the filling stations are equipped. By means of data transmission among them, a check on the material can be performed and, in case of an incorrect material, an error message can be sent to the driver of the trolley 7. In case of a correct material, its required amount will be indicated to the operator and a flap in the filling station can be opened in order to dump the right amount into the vessel. The trolley comprises a fork 8 on which the mixing vessel 5 is received, equipped with an electronic weighing installation linked to the central processing unit of the trolley 7, so that the exact amount of material dumped from the filling station is automatically transmitted to it and is stored in the memory of the trolley 7. These data are stored in the memory module of the mixing vessel 5 itself as well, so that, in this respect, both memories form a reflection of the other memory and, in case of a malfunction in one memory, the information is still present in the other memory. For that matter, small amounts of material poured from the paternoster 4 are, with a view to precision, weighed on a separate weighing machine linked to the trolley 7 during dumping, so that the exact weight data, too, are known to the central processing unit of the trolley 7.

When the right amount of material has been poured in and has been stored in the memory, the subsequent material can be collected which will, likewise, appear on the display of the trolley. After all materials in the recipe have thus been loaded, the trolley will drive to a point where the entire contents of the mixing vessel, i.e. the various materials and their weighed amounts, will be transmitted from the memory of the trolley to the central computer of the installation, so that a final check can be performed there and the history of the vessel can be updated. With this the process of collecting is finished and the contents of the vessel can be mixed.

For this purpose, by means of the trolley 7, the mixing vessel 5 is transported to one of the purpose-built mixing installations 30 of the installation, see figure 3, which is described in detail in the above-mentioned patent application, filed simultaneously by applicant, the content of which, with a view to conciseness, is considered to be included here. By means of the trolley 7, the mixing vessel 5 is delivered at the mixing installation 30, in which the mixing vessel is positioned and fixed, possibly later on by means of a simple hand lift truck. The badge of the mixing vessel 5 will then be situated exactly in front of an antenna with which the mixing installation 30 is equipped. By way of this antenna, a specific mixing program is loaded from the badge of the mixing vessel 5 into the mixing installation 30 so as to be subsequently completed by it. This mixing program comprises, for example, data concerning rotational speed, direction of rotation and number of rotations related to one or several steps of the mixing process during which the filled mixing vessel is, in its entirety, rotated around the driven shaft of the mixing installation, situated perpendicular to it. Information on whether or not the rotor 31 with side branches, the so-called lump breaker, taken in by the vessel, is required, as well as on the required intensity of its action is thus read out from the badge of the mixing vessel 5. The contents of the vessel are thus time and again overturned until eventually a homogeneous mixture is realised. Subsequently, the vessel can be taken out of the mixing installation and replaced with a subsequent vessel to be mixed. By thus mixing the mixture always in its own vessel, cross-

contamination of successive mixtures is prevented, while the need to clean the mixing installation thoroughly after each mixing cycle is avoided.

When the contents of the mixing vessel 5 have been mixed, the vessel 5 is transported to the packaging section 40 drawn in figure 4. Here a display shows which mixture is in which vessel. The vessel is placed in a rack 42 of the right filling level which is equipped with means to read out the badge of the vessel. The data stored in it are thus transmitted to the filling machine 41, which shows the data on a sublevel of the display as an additional means to check whether the right mixture is actually poured in. Eventually, in this way, the entire contents of the vessel are poured into a final package, after which the vessel is made available for reuse, starting with the cleaning in the tunnel-like washing installation as described above.

The invention thus provides a method and installation for mixing herbs and spices in which extremely strict supervision of the movements of the mixing vessels within the installation can be exercised and in which cross-contamination of different mixtures is excluded, or at least this chance is reduced considerably.

Although above the invention has been explained in more detail by means of just one single sample embodiment, it will be clear that the invention is by no means limited to the example given. On the contrary, for specialists many more variations and forms are possible within the framework of the invention. The process as described above can, for example, be expanded by additional checks, but, if required, checks can also be omitted. In addition, a different configuration of the installation can be chosen, without causing the invention to lose any value.

Claims

1. The present invention concerns a method for processing dry materials, herbs and spices in particular, into a specific mixture which involves filling a mixing vessel with the materials of the mixture, mixing the materials mechanically and, if required, pouring the mixture into a final package characterised in that the filling, the mixing and, if necessary, the packaging of the mixture are, in different places, performed in(to) and from, respectively, the same mixing vessel.

2. Method according to claim 1 characterised in that the mixing vessel is equipped with a memory module which can be programmed and read out electronically. In this module information on the contents and the identity of the vessel is stored.

3. Method according to claim 2 characterised in that the mixing vessel is filled on a trolley equipped with an electronic weighing installation as well as an electronic processing unit in order to receive a recipe for a mixture in electronic form and store it in a memory unit linked to it and to store weight data provided by the weighing installation in the same or another memory unit linked to the processing unit.

4. Method according to claim 3 characterised in that the weight data provided by the weighing installation are also stored in the memory module of the mixing vessel.

5. Installation for executing the method according to one of the preceding claims characterised in that for each material, at least for most of them, it contains a filling station equipped with means for data transmission to a central processing unit and a memory linked to it, which are associated to a mixing vessel to be filled, in that it contains a mixing installation which can mix the substances enclosed by the vessel, and in that the above-mentioned mixing installation, too, is equipped with similar means for data transmission.

6. Installation according to claim 5 characterised in that the central processing unit and the memory are fitted on a trolley on which the mixing vessel is placed, at least when in operation, and in that the trolley is equipped with means for data transmission to the memory module of the mixing vessel.

7. Installation according to claim 5 or 6 characterised in that a final filling station intended for filling a final package with the contents of the vessel is equipped with means for data transmission to the memory module of the mixing vessel.

8. Installation according to claim 5, 6 or 7 characterised in that it contains a washing station in which a mixing vessel is to be cleaned, and in that the washing station is equipped with means for data transmission to the memory module of the mixing vessel.

9. Installation according to one or several of the claims 5 up to and including 8 characterised in that the filling stations of several of the materials comprise a storage vessel of a design at least nearly identical to the design of a mixing vessel, incorporated in it as an exchangeable part, and in that the filling station comprises means for data transmission to a memory module on the storage vessel.

10. Installation according to one or several of the claims 5 up to and including 9 characterised in that the means for data transmission are always capable of blank contact electronic transmission of the data referred to.

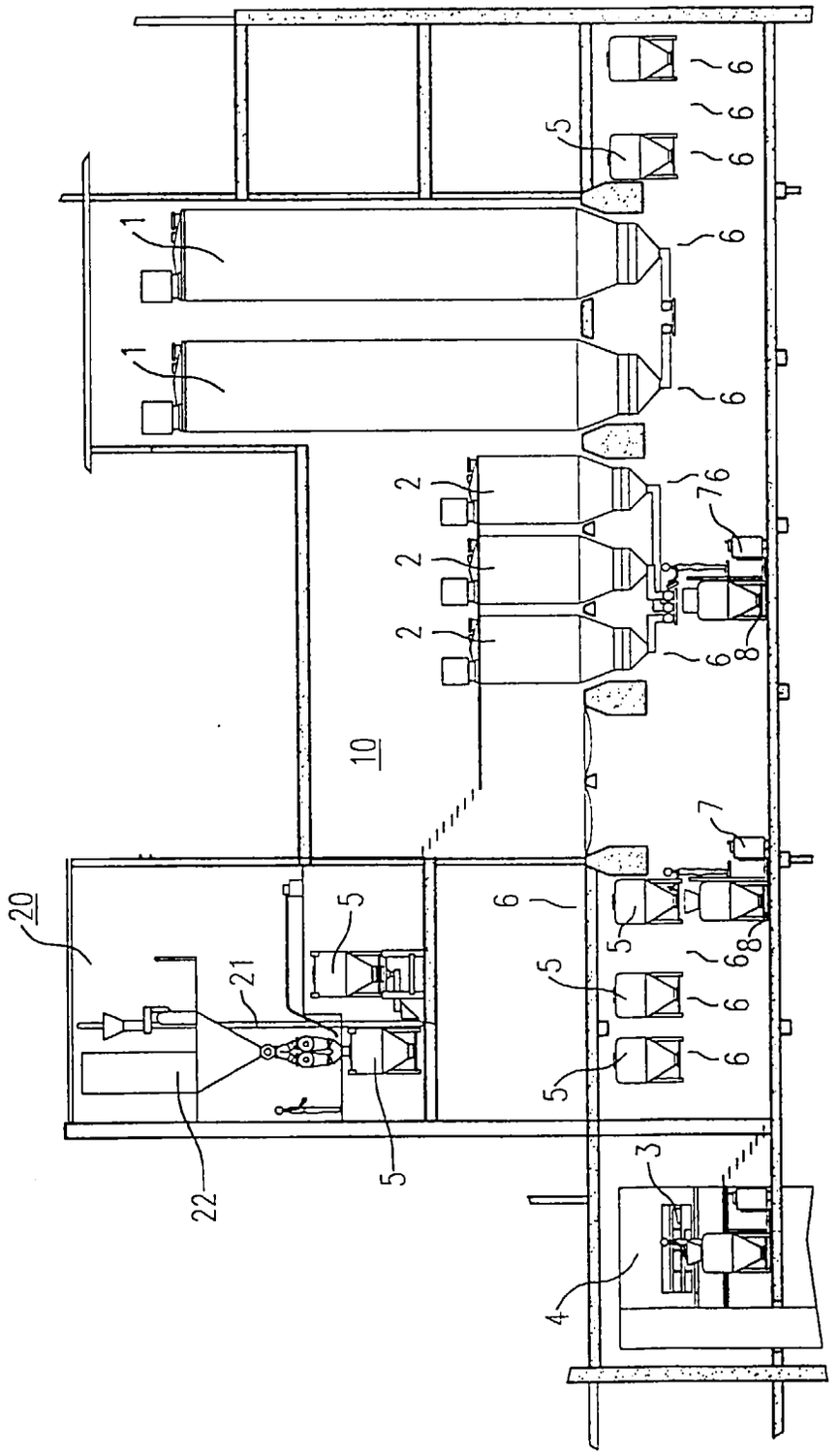


Fig.1

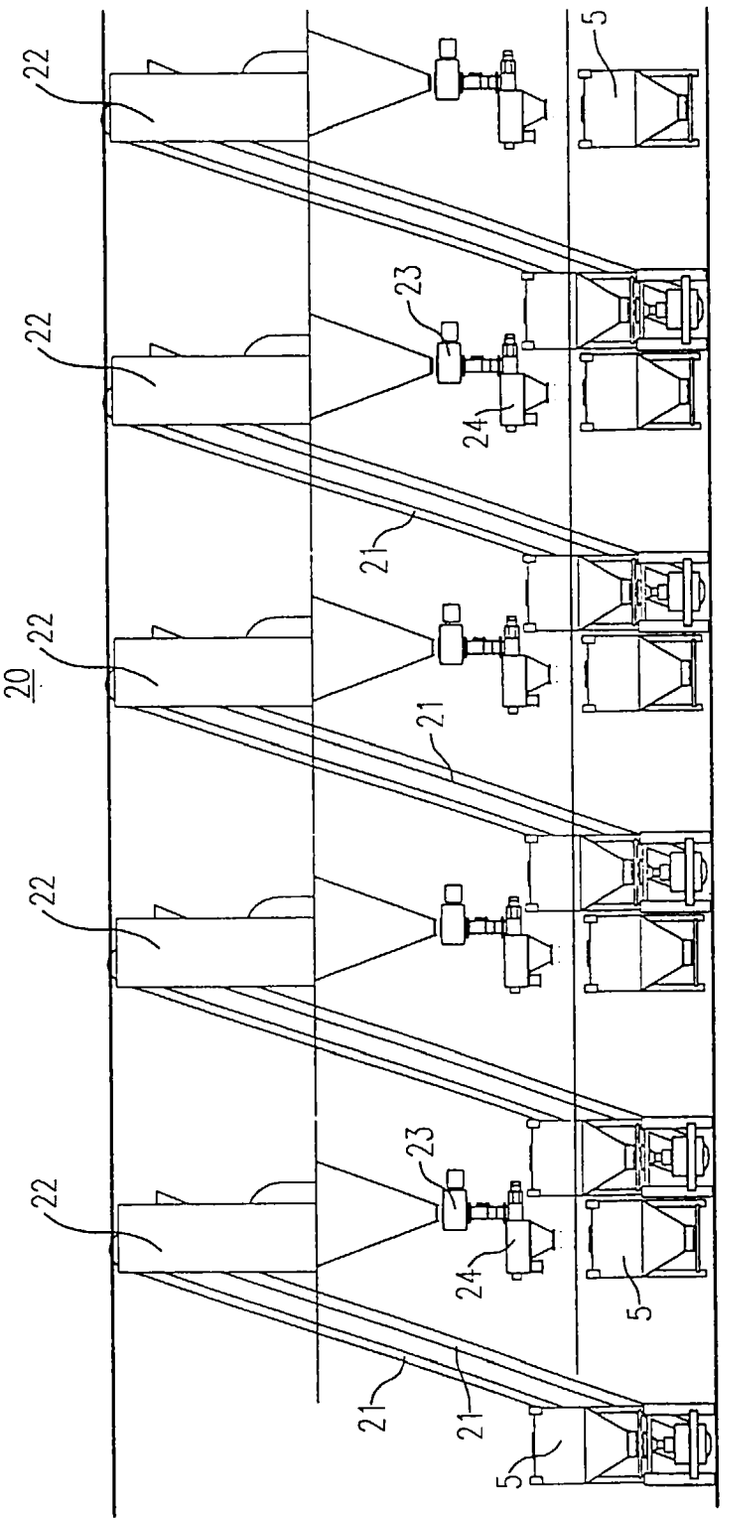


Fig.2

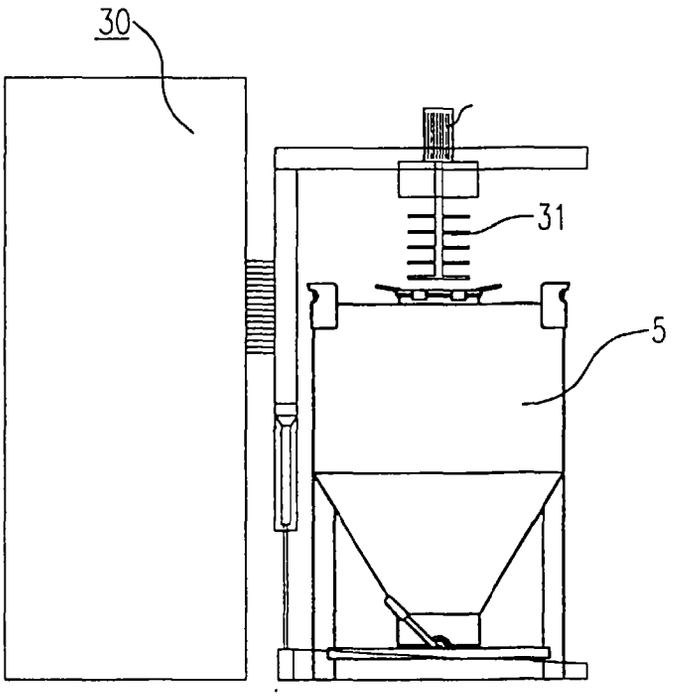


Fig.3A

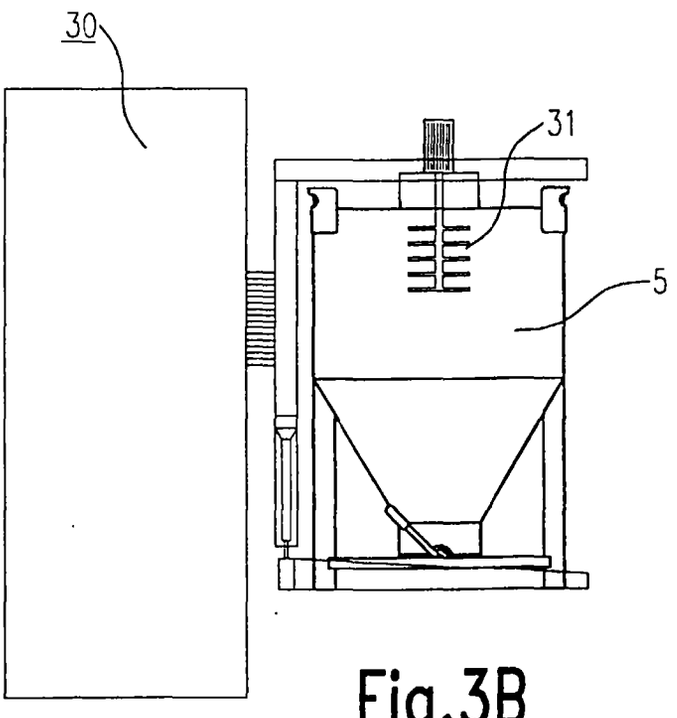


Fig.3B

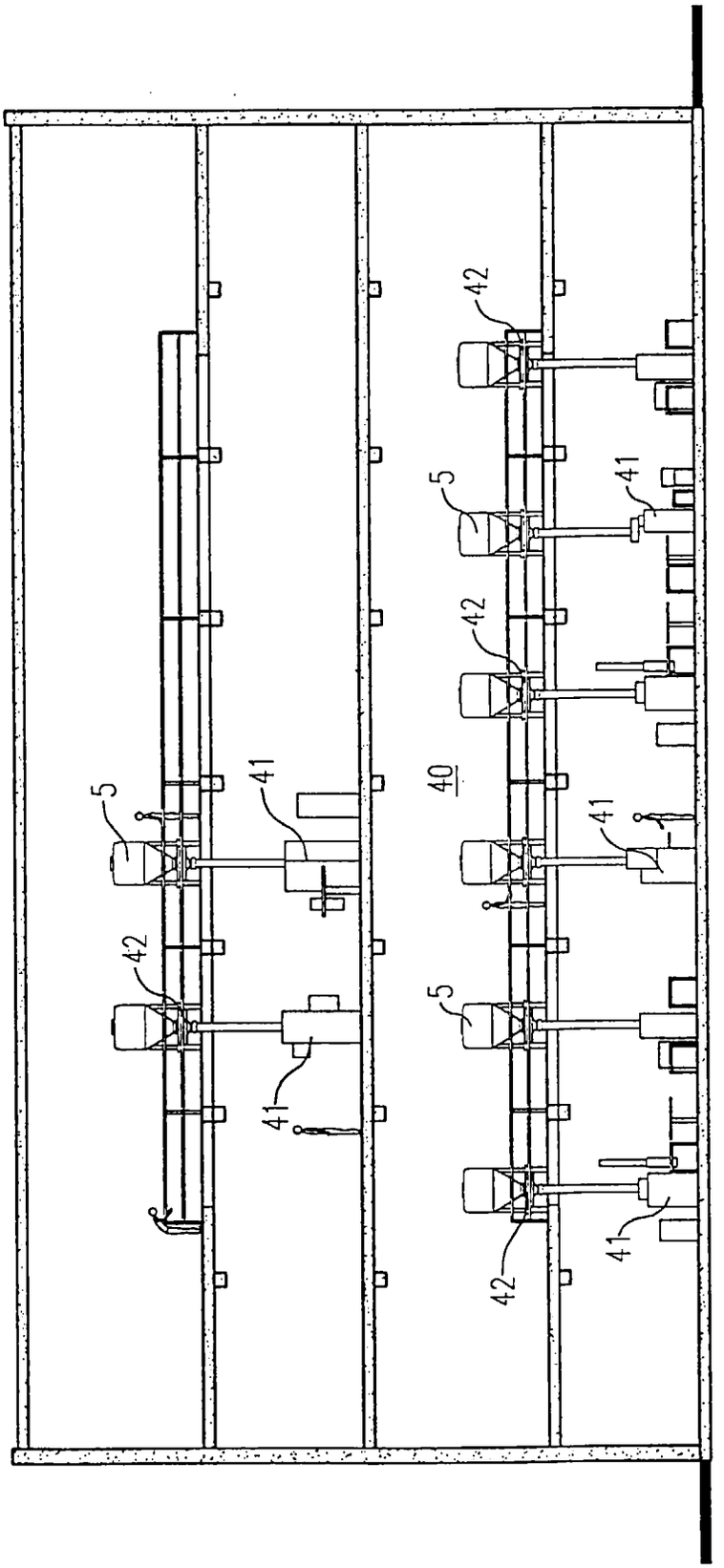


Fig.4