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(54) **CONTAINER BASED DISTRIBUTION SYSTEM**

VERTEILSYSTEM AUF BEHÄLTERBASIS

SYSTEME DE DISTRIBUTION A BASE DE CONTENEURS

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(73) Proprietors:
- **Dahl, Hans**
  **7680 Spoettrup (DK)**
- **Jeppesen, Erik Skytte**
  **7860 Spoettrup (DK)**

(72) Inventors:
- **Dahl, Hans**
  **7680 Spoettrup (DK)**
- **Jeppesen, Erik Skytte**
  **7860 Spoettrup (DK)**

(74) Representative: **Tellefsen, Jens J.**
**Patrade A/S,**
**Fredens Torv 3A**
**8000 Aarhus C (DK)**

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## Description

**[0001]** The present invention concerns a container and a distribution method for transport and storing material in pellet/granular form, including in particular animal feed, fertiliser, fuel pellets, and the like.

**[0002]** Particularly within agriculture there is need for transporting large amounts of material, partly in the form of feed to the farmer, and partly in the form of grain or other crops back to the feedstuff factory. About 60% of the raw materials for the feed production of the feedstuff industry stems directly from the farmer in the shape of grain and crops which form part of diverse feedstuff mixtures at the process in the feedstuff factory. Large amounts are thus transported to and fro between farmer and feedstuff factory.

**[0003]** The present distribution is effected by trucks driving grain or other crops to the feedstuff factory which then stores it and consumes the stored material as the production of feedstuffs progresses.

**[0004]** The feedstuff produced is stored in stationary silos that are typically up to 40 m high.

**[0005]** The feedstuff is typically produced in pellet form. This means that the feed is pressed through a matrix so that feed pellets appear which in connection with the present invention are included in the broader term granular material.

**[0006]** Since the pellets by their further processing in the system to the feed trough in the farm go through several transport processes, it is necessary to press the pellets rather hard in order that they do not break, particularly during the transport. To that end, a large amount of energy is used. When the pellets have been produced in the pellet press, they are transferred to storage silos by conveyors or screw conveyors. A typical storage silo is, as indicated above, up to 40 m high, i.e. when the newly pressed feed pellets are transferred to an empty or partly empty silo, they drop down against the bottom up to 40 m. When a farmer then orders a certain number of tons feed mixture, the feed pellets are transferred from the storage silo to a truck mounted tanker. The feed mixture is then driven with the truck mounted tanker to the farmer where it is blown up into the silo facility of the farmer. During this blowing in of the feed pellets they are particularly subjected to a very hard action, as the blowing in is to move them from the truck mounted tanker and typically 10 - 50 m up into the silo of the farm.

**[0007]** Filling a truck mounted tanker to full load takes about 45 minutes at the feedstuff factory, after which transport from the feed factory to the customer is to be performed, and at the customer the feedstuff is then, as indicated above, blown into the storage silo of the farm. The blowing in itself also takes about 45 minutes. The truck mounted tankers are provided with compressors so that the engine of the truck mounted tanker is used as power for blowing in the feedstuff. This means that the truck mounted tanker has to run stationarily with high load in order to empty the content of the truck mounted tanker into the storage silo on the farm.

**[0008]** Even if the storage silos of the feedstuff industry are strategically located across the country, there is always some transport from storage silo to consumer at each individual farm. If, as an average, there is reckoned with a distance to the customer of about 40 km, with the present price level about 50% of the delivery costs will be on loading and unloading.

**[0009]** Through the last decade, many farms have been bought by industrial farmers, in other words, the family farms become industrial farms with smaller group of owners owning larger units. This implies that the individual farmer is provided a far greater buying potential which means a greater competition in the feedstuff industry. The industrial farmer is also far better educated than seen 20 years ago, both in areas of operation and economy.

**[0010]** Acquisition of more units provides possibility for larger production for the farmer, but in general, the existing silos are retained, and since these are intended for the production of yesterday, they are generally too small and often obsolete with regard to the future demands for hygiene.

**[0011]** Today, society's demands to the farmer are that in his production he is to consider animal welfare, pure primary produce, a minimum consumption of antibiotics etc., but on the other hand, the sales prices of farmer are controlled politically by outlet possibilities for the slaughterhouses and on the long view by the world market price. Besides, to this comes that the livestocks become more vulnerable to possible attacks of illness due to the more and more sterile production conditions, also in connection with the medicine consumption in connection with livestock production is desired reduced by society. This implies that the farmer, due to relatively large production costs will be forced to produce quality with traceable primary produce, if he wants to survive. As animals are individuals with each their need for living conditions and feed, requirements for individual solutions on the side of the producers and the consumers will be sharpened in the future.

**[0012]** At the same time as the farms become larger and larger units with larger and larger production, there will also be need for a storage capacity on the feedstuff factories which will require very large investments in changing existing silo facilities as well as in new construction of further silo facilities. To this is added that the feedstuff factories will get a far more diversified production of feedstuff mixtures, as the increased industrial production conditions in livestock production will cause the animals to be fed with several different feed mixtures in the course of their growth. Thus there will created an increased flexibility in the feedstuff production.

**[0013]** In order to support the consumers' demand for transparency, the industry will be obliged to improve the possibilities for presenting documentation for the life cycle of an animal. This means that in the future, documentation is to be presented for how an animal has lived

from birth to slaughtering and from ingestion to lactation, in short the consumers of the future wants to know what they are eating. With a modem term this is called the soil-to-table principle. I.e. soil-to-table requires documentation of the whole way through the production process with regard to what the primary produce ending up at the consumers has been subjected to in the entire production process.

**[0014]** Document DE-A-19844631 describes a system for controlling, tracking and handling of objects, for example transport containers, where the container is provided with an electronic identification device which communicates with a mobile device whereby information bating to the transport container may be relayed to the mobile device. The information may relate to the exposure history of the transport container.

**[0015]** Thus there is a need for documenting and registering all steps and processes in the course from soil to table. If the production of feed for animals is made batch-controlled and delivered in traceable containers, the process of registering the animal's feed ingestion, by this is meant which raw materials are forming part of the delivered amount of finished goods, may be simplified and registered in a rational way. E.g. it may be noted that when the BSE-problem was on its peak, the feed producers were imposed to present documentation for which raw materials that formed part of their production and for the origin of the raw materials. This raised large problems for the feedstuff industry, as registration of these conditions today is rather insufficient.

**[0016]** It is the purpose of the present invention to provide a container and a distribution system providing savings in the form of greater storage capacity in feedstuff factories, lesser transport costs, less energy consumption in production and more flexible transport of feedstuff from the feedstuff factory to the consumer, when the system is reporting an aroused need, whereby higher degree of utilisation of the material is attained as well as documentation for what has been shipped where and when.

**[0017]** This is achieved by using a container according to the invention in a system as described, by the container being peculiar in that external dimensions of the container are within international standard dimensions; that an outlet funnel with connecting means for a transport system and means for opening and closing access to the interior of the container are provided at one end; that an interface is provided with which another control unit may activate a transport unit provided in the lower longitudinal side for internal transport in the container of the granular/pellet-shaped material; that in the interior of the container there is arranged at least one sensor for detecting the temperature and/or the air humidity of the container, the sensor communicating with a modem; that at least one electronic identification means for identifying the actual container is provided on the container; that a disinfection system is arranged inside the container and is connected to the modem, the disinfection system capable of being activated via the modem and central computer; and that the sensor and the disinfection system are connected with a control circuit.

**[0018]** Above, the container has been described as used in the feedstuff industry, but in principle, the container may transport all types of loose goods, bio-fuel pellets, fertiliser, fish feed, a few raw materials for home mixers, e.g. soy flour, ecological grain, in general goods requiring traceability. The container will provide the transported goods with more gentle handling as compared with present systems.

**[0019]** Container transport is based on standard trucks, such as container bodies in ISO standard dimensions, and may transport a maximum amount according to national transport rules, implying an optimal utilisation of fuel during the transport.

**[0020]** As the system is based on the container having dimensions as an ISO standard container, the container size may be adapted to the rules that may exist in the areas where the system is used. The containers may thus be adapted to local conditions with regard to maximum load, axle load, and whatever may be applicable for common road transport.

**[0021]** Furthermore, by providing an outlet funnel and connecting means for a transport system connected with opening and closing means, it is provided that the granular material inside the container may be brought to an outlet funnel so that the material may be further transported to a place of consumption. Furthermore, at a lower longitudinal side, e.g. the bottom, there is provided a transport unit for internal transport inside the container, so that the material, as function by activation of a control unit may be advanced to the outlet funnel.

**[0022]** Moreover, by arranging one or more sensors for detecting the temperature and/or air humidity of the container inside the container and furthermore by connecting the sensors to a modem, thereby enabling gathering the information, it is ensured concurrently that the storage conditions for the material inside the container are not exceeding empirical limits for when the material is not. These empirical limits may e.g. be too high air humidity or too high temperature. Too high air humidity and/or too high temperature may indicate occurrence of fermentation, if e.g. the case is animal feed, as well as elevated temperature may also indicate fermentation in the material or, in cases where grain is transported back to the feedstuff producer, risk of self-ignition or the like in the material.

**[0023]** The electronic identification means serve generally to detect whether the container is on the store or at a place of consumption, and in case of position at a place of consumption which place is the case. Besides, the electronic identification means are used for detecting when a container returns to the container storage place. This registering in the central data register implies that the container concerned is available but not released for use before having passed preparation procedures for reuse. These preparation procedures include,

among others, disinfecting the interior of the container. For that use, a disinfection system is installed in the container. Hereby it is possible, when the system needs the container, that the system activates the disinfection system shortly before the container again is to be filled with granular/pellet-shaped material. Hereby is ensured that containers standing unused for a long time are disinfected immediately before reusing. Again, this is an important element in the problem of securing the hygiene through the entire process from soil to table.

**[0024]** In a further, preferred embodiment of the invention, the transport unit inside the container is either a walking-floor, a conveyor belt, e.g. of the Redler type, or a screw conveyor. All these transport units have demonstrated their reliability as well as it is possible with the disinfection system as developed and utilised in connection with the present invention to achieve a satisfactory cleaning. Furthermore, particularly with walking-floor or conveyor belt there may be transported in the entire width of the container so that it will not be necessary to provide a funnel-shaped cross-section in order to guide the material towards a relatively narrow transport unit. In cases where the nature of the material or other reasons makes it desirable to use a screw conveyor or the Redler type, a longitudinal funnel-shaped construction may be provided inside the container so that the material, due to the slope of the tunnel deviating from vertical, will slide down to the screw conveyor.

**[0025]** In order to allow utilisation of the container for transport in both directions, in a long side of the container there may be provided a hatch extending in largely the entire length of the container and in at least one third of the height of the container. Such a hatch may be used by the farmer for filling crops that typically constitute about 60% of the content in feedstuff mixtures.

**[0026]** Thus, the container may furthermore form the structure of return transports from the farmer to the feedstuff factory, as the farmer is supplier of up to 60% of the content in the finished goods. For this use, the container is provided with hatches or shutters so that the farmer may fill the raw material directly into the container with a usual front-mounted grab bucket or with a wheel loader. In the embodiment of the container where a transport system is provided at the bottom of the container, and where the container lies down in the state of use, a hatch in the side tilted outwards may form an inlet funnel so that the farmer may fill return material for the feedstuff factory over largely the entire length of the container. Hereby is achieved an enormous saving as the traditional truck mounted tankers used for feed transport cannot carry return loads in the same way. Hereby, driving capacity is utilised optimally.

**[0027]** The disinfection system constitutes an important piece in the total distribution system, as by disinfection of the container before reusing there is achieved a documented hygiene level which is not known in the industry. The disinfection system may e.g. be provided with a spray system with one or more nozzles inside the container so that the nozzles are connected via hoses to an external reservoir, and that pressure may be established in the nozzles of the reservoir hose so that an agent may be atomised inside the container.

**[0028]** Just by atomising an agent inside the container, there is achieved a complete disinfection of all surfaces inside the container. This is also the case with hidden surfaces, i.e. for example, at the underside of conveyor belts or walking-floor, as the agent atomised inside the container, due to the turbulence produced thereby, will come into all cavities and hereby also at the underside of objects provided inside the container.

**[0029]** In a further, preferred embodiment it has appeared that the agent disinfected inside the container advantageously may be chosen as an ion powder, since this has strong disinfecting properties, as well as the ion powder will be neutral typically after one to two hours and thus will have no influence on the materials that later may be placed in the container. By using a disinfectant becoming inactive after shorter or longer time, it is thus not necessary to clean the container subsequently, but by keeping the container closed it is ensured that the container maintains its clean state until the time of use, i.e. the time where new material is filled.

**[0030]** In a further, preferred embodiment of the container, the interior of the container may be divided into separate chambers, so that each chamber may be connected to common or to separate means for emptying the container. In this embodiment, it becomes possible to transport several different materials in the same container. This is particularly interesting for small farms, where different feedstuff mixtures are to be used for different animal species or for different stages during the growth of individual animals.

**[0031]** This system is also particularly suitable for the group of farmers mixing their own feed mixtures, the so-called home mixers.

**[0032]** Compared with the present transport systems of the feedstuff industry, the savings potential will be about 29% of the transport costs only, including the time used by a traditional truck mounted tanker for blowing feedstuff up into the farmer's silo. Concerning the environmental load in the form of $CO_2$, $NO_x$, heavy metals etc., the increased transport amount per delivery will mean a substantial saving. The concept furthermore also implies that waiting time by unloading is minimised considerably by virtue of the movable containers standing ready for collecting at the store, which means that the lorry may transport more tons per day.

**[0033]** The use of standard structures for delivering feedstuff will furthermore substantially reduce investment volume in the fleet of vehicles. With the present structure, it is specially made truck mounted tankers that transport the feed from the feedstuff factory to the farmer. This implies that a farmer with a small silo occupies transport capacity which otherwise could be used for freighting more feedstuff to another customer. To this is added that the truck mounted tanker is standing still,

wearing the engine for about 45 minutes in connection with each transport due to emptying as described above, as the lorry engine is used for blowing in the material. By arranging a system where the containers have standard ISO dimensions, normal trucks, i.e. vehicles which are not custom-built for feed transport, may perform the transports. In cases where smaller farmers only have need for a small amount of feed, a lorry may thus drive with several small containers to several different farmers. Hereby the transport process is optimised. By having a certain amount of empty containers available at the feedstuff factory, the factory may continuously produce feedstuff, as the finished goods are loaded directly over into the movable container which is then put on the site.

**[0034]** By the traditional way of delivery, where a truck mounted tanker uses 45 minutes for being loaded at the feedstuff factory, driving time to the farm, and about 45 minutes for blowing the feedstuff in, an environmental load is furthermore produced in the form of a high noise level as well as energy waste in connection with the blowing. With a distribution system with movable containers as indicated in the present invention, the whole process is avoided and advanced. The lorry may immediately, at any time of the day, load a filled container, drive it to the farmer and unload it there without causing any inconvenience in the form of noise or unnecessary environmental load. Thus it will be possible to distribute feed at all times of the day and in this way to optimise utilisation of the vehicle fleet.

**[0035]** The feedstuff industry is impeded by too many and too small mixtures for the individual customer which, with the present structure of the feedstuff production, results in increased production cost due to change and empty driving between the single productions:' Furthermore, the many small productions require a large number of silos which the industry does not have today. This is giving the logistics departments in the feedstuff industry a great planning work where a missing lorry may hamper the production due to disposition of a single three tons mixture in a silo which is blocking the entire plant because of lacking possibility of emptying.

**[0036]** A large part of the logistics problems of the industry will be solved if production is made to movable containers. A typical, movable container should contain from 8 to 30 tons. As described above, the system opens the possibility of variation in individual weight indications, as the only requirement to the container is incorporation in a frame fitting with an ISO standard container.

**[0037]** By producing to a container typically containing from 8 to 30 tons, this will imply that single productions are raised from an average 6 tons to 15 tons. By change in feed production between one mixture to another mixture on a standard feedstuff factory it takes about 15 minutes with full empty running of coolers and conveyor paths to finished containers. Between each differing mixture, the entire production system is to be cleaned and run empty in order not to get mixing of the individual feed mixtures. By also increasing the production amount to a double batch size, there is achieved an almost halving of the power consumption per tons feedstuff produced, as the machinery in the feedstuff factory is largely to perform the same work whether a feedstuff mixture is 6 or 30 tons.

**[0038]** The quality of the feed mixture can also be improved, as typically an 8 $m^3$ vertical mixer is standing on most feed factories. This kind of mixer is good for mixing the feed product if the filling is optimal, i.e. if filled up to the 6 tons to which it is dimensioned. By small productions of a mixture, the vertical mixer causes problems by mixing the material into a homogenous mass, implying that minerals and vitamins and other additives will be very strongly represented in the first tons of the production and conversely may be lacking in the last tons of the same production.

**[0039]** The feedstuff production at the individual factory may also be increased, typically up to about 2 tons per hour, as the finished goods treated in a distribution system according to the invention with movable containers will not be exposed to the same load on the individual pellet at the processing from machine to feed trough as described above. At this point, it is particularly the action of being placing in an almost empty silo, where the individual feed pellets are to fall down from the top of the silo and to be dropped over into the truck mounted tanker together with the very violent blowing into the farmer's feed storage silo. When individual feed pellets are not exposed to this treatment and thereby are not in danger of being destroyed in a similar way, they may be pressed in the pellet press with lesser pressure, implying a lesser energy consumption but also implying an increased production as the pressing time may be reduced.

**[0040]** Some farmers, the so-called home mixers, are mixing their own feed mixtures, as with the present systems it will be too expensive for the feedstuff producers to make these special mixtures, as the number of tons used is relatively small. With a concept as described in the present invention, it will, however, be possible to make relatively small special mixtures at competitive prices. This provides the farming industry and the society with a number of advantages. Studies have shown that factory-made feed reduces the farmer's feed consumption per kilo growth in the livestock and minimises the discharge of nitrogen. Society will receive a saving as feedstuff is mixed under factory conditions and stored in a traceable manner, namely by registered containers, so that the feedstuff in a way corresponding to a large-scale consumer may be documented the whole way from soil to table. Since it becomes economical to make small mixtures, as the producer is not to occupy a whole silo for a very limited amount but may immediately load it on movable containers from the production plant, the price can also be kept low.

**[0041]** For some farmers, particularly the so-called hobby farms and other smaller consumers, the system

will be suited in an alternative embodiment. By erecting a battery of containers at a central place in the local community, the individual consumer, be it a hobby farmer or a horse keeper, alternatively a consumer with an automatic stoker using wood pellets, may collect a portion from a self-service battery by himself. By providing a weighing belt on weigh cells connected to a PLC control program which in turn is connected to an electric motor driving an emptying device in individual containers, the consumer may serve himself for a given amount of the desired mixture or the granular material, e.g. wood pellets. The consumer may thus, with credit card or the like, pay in a slot machine for a given amount of kilo and by means of the PLC control program activate the emptying device in the container concerned, so that the amount of feed or wood pellets or any other kind of granular material may be transferred from the movable container to the consumer's own means of transport, e.g. a trailer.

**[0042]** As described above, the invention also concerns a traceable distribution method for traceable distribution of a granular/pellet-shaped material including at least two containers as described above, an transfer device disposed close to and in connection with the place of consumption, the transfer device having means for connecting to the container; that the transfer device has means for detecting and summing up how much material having been brought from the container and into the place of consumption; that the transfer device has means for activating the transport unit in the container as a function of the content of the transfer device; that the transfer device has means for communicating with a central data registering system and/or a container store; that after emptying the container on the place of consumption, the container is brought to a container store, where electronic identification means on the container are detected and data are transferred to the central data registering system; that the container is disinfected by activation of the disinfection system provided in the container; that report of the disinfection triggers a ready-for-use report in the central data registering system, after which the container may be reused; that filling of container occurs by simultaneous detection of material and/or mix batch number and container identification code and consumption address; that the container is brought to the place of consumption and is connected to the place of consumption via the transfer device.

**[0043]** By bringing the container in connection with an transfer device having connection to the place of consumption as described above, material from the container may be conducted over into the transfer device, whereby the amount of material moved into the transfer device and thus to the place of consumption may be registered very accurately and added up so that the consumer pays for the amount of material that is moved to the place of use.

**[0044]** The transfer device acts as a kind of buffer so that immediately there may be introduced a very large amount of material into the transfer device, e.g. while the container is exchanged. When the amount of material in the transfer device reaches a low level which is detected by the means for detecting, the means in the transfer device may activate the transport unit in the container so that the transfer device is filled again. By communicating how much material is conducted into the transfer device, it may be registered how much material is consumed and thereby how much material the customer is to pay for, but also it may be calculated and foretold when the container is to be exchanged. Thus, the container is exchanged when a consumption largely corresponding to the content of the container concerned has been registered.

**[0045]** After emptying, the container is brought back to a container store, where the electronic identification means on the container are registered, and these data are transferred to the central data registering system.

**[0046]** Thereby, the path of the container before filling of material, filling of material including registering type of material, amount, time and destination, transport to the destination and information about the rate of consumption/circulation of material in the container, as well as by means of the incorporated sensors it has been possible during the whole course to detect temperature and humidity in the container. Thus a cycle has been finished where the traceability and thereby documentation for what has been delivered where and when as well as the condition during which delivery has occurred has been continually registered during the entire course of events.

**[0047]** After this, the container is placed on the container store in order to be disinfected before use by activation of the disinfection system provided in the container, whereby a ready-for-use report is triggered in the central data registration system, so that the container may be reused and filled with new material, which again becomes registered before delivery to the place of consumption.

**[0048]** The special properties provided in and around the container are thus used for a traceable distribution system whereby it becomes possible to document/verify the path of the material from soil to table but also possible to control production and invoicing of the product.

**[0049]** In a further, preferred embodiment, the transfer device is arranged on weigh cells whereby by registering the weight progress compared with how much material has been brought from the container into the transfer device and further on to the place of consumption, it becomes possible to detect how much material is brought from the container to the place of consumption. This may be used for invoicing purposes, but may also be used for planning the further logistics so that a new, filled container may be brought to the transfer device before the buffer capacity of the transfer device runs out.

**[0050]** In a further, preferred embodiment, there is provided a back-up system so that the container, after having been used a number of times, i.e. identification number of the container has been registered at the ar-

rival to the site a number of times, thereby triggering manual inspection and/or internal and/or external container cleaning. In this way it is provided that even though the system transmits a ready-for-use report based on activation of the disinfection system, the containers are inspected manually with regular intervals in order to ascertain possible damage, leakage, and the like that may have influence on the quality level of the distribution system.

**[0051]** In a further, preferred embodiment, the system is expanded so that registration of material and/or mix batch number and container identification code and address of consumption are collected automatically, and these date activates a debiting system whereby an invoice is printed to the place of consumption, or the account of the place of consumption is automatically debited as a function of transporting the registered amount of material from container through transfer device to the place of consumption.

**[0052]** Thereby is achieved a further saving in the form of less administration in connection with invoicing/settling for the material delivered. As the system via e. g. the weigh cells as indicated above is registering the amount of material actually supplied to the place of consumption, the consumer is thus not invoiced for possible remains in the container but only invoiced for the actual consumption.

**[0053]** In large systems where many containers are used as well as there are used different mixtures of materials, the system is expanded so that by registering the electronic identification code of the container, this triggers a position indication for placing the container at the container store. Hereby is ensured that containers, which are not yet disinfected, are disposed at a certain place whereby it impossible to use a unchecked/not disinfected container before this container has been disinfected and thereby released for reuse.

**[0054]** Depending on which material is used in the above described distribution system, the disinfection, the manual inspection and other sensor systems are to be adapted for the material/mixture of material concerned.

**[0055]** In the following, it will be described shortly how a cycle, i.e. how a course for a movable container, may take place.

**[0056]** At the feedstuff factory, an arrived empty container, which has entered the store, is registered, e.g. via electronic identification means connected to a centrally controlled computer. In the case where the container carries goods returning from the customer, this has been registered in the system in advance. This may e.g. be effected by the user calling the feed producer who then reprograms the central computer and informs that a filled container is now ready for collecting raw materials for the feedstuff production. Then the filled container is driven back to the feedstuff factory where it is emptied and then disinfected.

**[0057]** Disinfection may typically occur by one or more nozzles located in the container spraying an ion powder as a mist inside the container, very rapidly and effectively killing all micro organisms and bacteria inside the container. This ion powder is known in the industry.

**[0058]** The nozzles are typically connected by hoses to an ion powder reservoir. After the empty disinfected container having been registered in the system, the container is checked for possible defects or damage, and this is reported to the central system again, possibly via a radio piece. A radio piece is a piece on which data may be recorded. Data recording may e.g. occur by wireless transmission. Reading data from the piece occurs by activating the piece with a unique call system, whereafter the desired data are transmitted from the piece. The radio piece is used among others for controlling logistics on large facilities for reloading goods.

**[0059]** The container is taken off the lorry with a container truck and is stacked in the stock of empty containers. The number and kind of empty containers are hereby registered in the central computer at the feedstuff factory. This means that in the storage system it may always be seen which containers are available on the place of storage.

**[0060]** A given order for manufactured goods is produced, and a radio piece is generated and reports to the central computer. The system controls by itself the stock of empty containers at the place of the stock and finds the container which most optimally fits the mixed amount and then applies the container number to the order for manufactured goods. Containers that have been reported deficient of damaged in the previous steps are locked in the system until they, by a ready report code, have been released by the system again. The central computer transmits its information to the radio piece on the empty container and is paired in the system before filling. The system acknowledges by indicating at which loading tube the feed mixture concerned may be collected. A container truck then fetches the empty container with the correct number in the stock and fills it at the indicated loading tube. In order to access to the loading tube and thereby the feed mixture, order number and loading tube number in connection with a PLC-controlled valve or the like mounted at the loading tube are typed in. Hereby is ensured that the correct mixture ends up in the right container. The weight of the goods is registered concurrently by weigh cells during the filling. It is possible concurrently to collect data with regard to feed mixture, container number and amount weighed in, or this may be performed later with a portable scanner which is inserted in a docking station.

**[0061]** In a letterbox disposed on each individual container, a delivery note with information about feed mixture and customer and production data is provided, after which the container is placed in the stack with outgoing containers, ready for delivery at the customer. When a lorry arrives at the place, he may be informed by the central computer system about which container he is to collect and where it is to be driven. Then the container

truck loads the container on the lorry who, by taking out the delivery note from the letter box on the container, may be ensured that he has loaded the correct container to the correct delivery address. The above may also be performed electronically.

**[0062]** When the lorry arrives at the customer, the container is placed at the end of the empty container. Power and discharge screw conveyor are mounted so that the feedstuff mixture may be transported to the animals in the stables via the transfer device and existing feed system. Then the empty container is loaded on the lorry and driven back to the container store. Then the empty container is registered as having entered the stock via the radio piece as mentioned above, and the container is then ready for renewed use.

**[0063]** In some situations, it is desirable to produce a greater amount of feed on the factory than needed immediately by the customers. This may be the case with standard feed mixtures. This is also the case with fertiliser and fuel pellets.

**[0064]** As described above, one may also achieve greater turnover rate, as the containers will be cheaper to bring to the customer than by the present systems. This will also imply that regular checking of the container with regard to toxic formations in old feed residues may be performed, as well as toxic formation problems and bacteria problems as a whole will be minimised since the container is disinfected by blowing in atomised ion powder before each filling. Besides, the container will always handle freshly produced feedstuff.

**[0065]** The transfer device is connected to a telephone modem which with regular intervals, e.g. once a day, registers the actual consumption at the farm. This provides the logistics function at the feed producer the possibility of registering the daily consumption of the customer and, not the least, to anticipate when the container standing at the farmer is to be exchanged with a new full container with feed. Correspondingly, fuel pellet, fertiliser or other granular material consumption may be monitored. In that connection, all containers standing at different consumers may be called daily and the actual daily consumption may be registered. As the system knows the weight of the manufactured goods at delivery, the time of changing may be calculated fairly accurately, why the production at the producer may be planned relatively precisely, which in turn implies substantial savings in storage capacity and provides possibility of an optimal utilisation of production capacity.

**[0066]** By a method as described above, it will be possible to register all steps in the process, as the feedstuff producer will have registered where and which raw materials are coming from which farmer and which other constituents are coming from where and when. This information is printed out and stored at the feedstuff factory but is also following the goods and thereby the container to the farmer who can attach this as documentation to the slaughterhouse when delivering his completed livestock. In this way, standard reporting is achieved which is very detailed with regard to the entire process from soil to table.

**[0067]** In the above, the invention is described particularly with reference to farmers, feedstuff and feedstuff production, but the concept is of course just as applicable to all other similar distribution systems where granular material is to be produced, transported and consumed at a consumer.

**[0068]** The invention will now be explained more closely with reference to the accompanying drawing where:

Figs. 1a - c show unloading and arranging of a container,
Figs. 2a -c show preparation of a container end for arranging by activating hydraulic cylinders,
Fig. 3 shows a variant of an arrangement according to the invention,
Figs. 4a-c show different container variants,
Fig. 5 shows a distribution arrangement for self-service,
Fig. 6 shows the logistics system schematically, and
Fig. 7 shows an arrangement with an transfer device.

**[0069]** In Fig. 1a is shown an example of a container 1 according to the invention, where e.g. a 20 $m^3$ container is loaded on a lorry with a hoisting platform 2. When the lorry arrives at the unloading site, it will move the container 1 up into the position of use, as shown with stippled line, by means of the tilting platform 2. The unloading site 8 is the place of use of the container, where suitable means are found for connecting to transport means so that the feed mixture inside the container 1 may be transported from the container and to the livestock. The container 1 is provided with a frame 3 corresponding to the outer dimensions of a standard ISO container. An end of the container 1, namely the one which becomes the bottom in the state of use, is designed with bottom frame 5 that may be angled relative to the remaining frame 3, so that when the container 1 is placed on the unloading site 8, the container will rest on the unloading site 8 by its bottom frame 5, which means that the container will form an angle with horizontal of about 60°. Experiments with granular material, including particularly feedstuff mixtures in pellet form, have shown that by arranging the container wall so that it stands 60° from horizontal, the granular material will slide down by itself, thus ensuring that the granular material slides down towards the transport means moving the granular material out of the container.

**[0070]** In Fig. 1b, the transport container 1 is shown in upright position as seen perpendicular to the view in Fig. 1a. Here, the cone or pyramid stub 10 is clearly seen, designed so that the longitudinal sidewalls form an angle of 60° with horizontal. Besides, an access hatch 7 is shown at a long side of the container 1. The hatch or shutter 7 is sealed in such a way that during

normal use it does not allow moisture or air to penetrate into the granular material inside the container. After emptying the container 1, it may be reused for return transport of raw material for e.g. a feedstuff factory. Here, the hatch is opened, and the farmer may then fill e.g. grain into the container 1.

**[0071]** In Figs. 2a - 2c an arrangement corresponding to that shown in Figs. 1a and 1b is illustrated with the difference that the bottom frame 5 is pivotably mounted at 11 so that activation of a hydraulic cylinder 12 results in that the bottom frame 5 pivots from the position shown in Fig. 2a to the open situation shown in Fig. 2b. In the upright position of the container 1, i.e. the state of use as shown in Fig. 2c, adjustment of the hydraulic cylinder 12 may determine an optional angle for the container wall relative to the horizontal. This is particularly interesting where granular materials with a slide angle different from 60° are stored, which is a typical slide angle for feedstuffs in pellet form. Apart from the pivotable function of the end frame 5, the container is otherwise equipped in a similar way as described above with reference to Figs. 1a and 1b.

**[0072]** In Fig. 3 an alternative embodiment is shown, where at the unloading site there is provided a ramp on which the lorry 2 with the container 1 on the platform is backing up. Then the container 1 is tilted over an edge on the unloading ramp, after which the container is standing fast leaning onto the edge of the ramp 9. In this embodiment, the cone or pyramid stub is mounted as end on the container whereby a further transport means (not shown) may convey the material, which is led out of the pyramid or cone stub at the bottom of the container in the upright position, further on for distribution among the livestock.

**[0073]** In general, for all embodiments it is the case that the pyramid or cone stub is pivotably mounted, e. g. by a hinge 13 mounted in an upper part of the container in the transport situation, so that the cone or pyramid stub may be pivoted upwards whereby the container may be emptied very quickly at the tilting. This is particularly interesting in cases where return goods are placed in the container, e.g. grain or other crops for use in feedstuff production. Hereby the material may be unloaded very quickly at the return of the container to the grain and feedstuff producer.

**[0074]** Generally, for all variants of the invention it is the case that hatches 7 or shutters may be arranged at an upper long side of the container. By an upper long side is to be understood the side facing upwards when the container with frame is placed e.g. on the platform of a lorry. The hatches and shutters 7 are used for providing access to the storage compartment of the container so that the container may be filled with return goods after emptying, e.g. in the shape of grain or other crops.

**[0075]** In Fig. 4b is shown a container in isometric view, where it is clearly seen that a hatch 7 is arranged at largely the whole upper side of the container. In the example shown, the container is shown as a circular cylindric container, but any geometric shape, including four-edged, pentagonal, hexagonal, may be used. Also, on Figs. 3 and 4b there are illustrated the top-mounted hinge 13, which is used when the cone or pyramid stub 6 is to be swung away for rapid emptying of material.

**[0076]** In the embodiments of the invention where a cone or pyramid stub for discharging the material is not used, the end of the container is mounted so that it may pivot about a top-mounted hinge.

**[0077]** In Fig. 4a, there is shown a further variant of the invention, where at the lower side face of the container 1 there is arranged a tilting platform 15. The tilting platform is connected with hydraulic cylinders (not shown) which again are connected with a pump arrangement 14 which by activation will result in that the tilting platform is tilted upwards so that the container 1 is raised, whereby the granular material inside the container 1 will slide down against the end face 16, where a further transport means (not shown) is arranged for further transport of the granular material.

**[0078]** Fig. 4b shows a circular cylindric container according to the invention, where a conical stub is illustrated at one end, where an outlet may be connected to further transport means for the granular material to the consumer. Besides, the position of the top-mounted hinge is seen, which is used when the container is to be emptied quickly, whereby the conical stub may be swung away from the end. Additionally is seen a top hatch mounted in largely the entire extension of the container. This is particularly used where the container is to be filled at the farmer with e.g. grain or other crops.

**[0079]** In Fig. 4c is illustrated a variant of a container according to the invention, as this container is intended for being used in lying position, i.e. a side face will form the bottom in the container in the state of use. In the example shown, a screw conveyor 17 is arranged at the bottom of the container, as well as a bulkhead 10 is arranged for ensuring that the granular material slides down along the sides of the container, hereby reaching the screw conveyor 17. In a preferred embodiment of this variation, the container system is provided with e.g. legs so that the container by means of these legs may be released from the lorry. When the container is empty, the lorry may thus back in under the container, after which the container sits on the lorry that can move the container back to the production location.

**[0080]** The container illustrated in Fig. 4c is also provided with a hatch 7, which may be tilted out and form an inlet funnel, so that granular material, e.g. grain, may be filled into the container very easily and quickly. In the example shown, the hatch is shown as a side hatch, as one side in the container may be tilted out at a certain angle from its usual plane.

**[0081]** Fig. 4d illustrates a container where the interior of the container is divided into e.g. five separate chambers, each provided with a screw conveyor at the bottom. This type of container is particularly used for con-

sumers desiring to receive several different types of material in relatively small portions. This may be particularly of interest for home mixers and mineral customers, where in one chamber chicken feed may be placed, in another chamber pigs' feed may be placed, in a third chamber fertiliser, or another combination of materials.

**[0082]** In Fig. 5 is illustrated a still further use of the invention. The figure illustrates a container battery for an unmanned station. In the shown arrangement, containers are arranged so that the consumer by self-service may take out the kind and amount of material desired. The container battery is built up of several containers 1. A control board 19 is equipped so that the consumer, by typing a code or paying with credit card, in a way similar to self-service petrol stations may select from which container and which amount from the desired container he desires to take. Then the typed information is transmitted via a PLC-control to the container in question, where the motor 18 of this particular container is activated for emptying material into the purchaser's lorry or trailer. By this arrangement, it is thus possible to service a large connexion with different needs in an easy and rational way, as the containers may be remote controlled by means of weigh cells coupled to a telephone modem that exchanges data with the central store, whereby is may be ensured logistically that enough material will always be present in the containers in the self-service facility.

**[0083]** In Fig. 6 is illustrated a distribution cycle, where the reusability of the container is shown. The cycle may e.g. conunence at the unloading site 8 of the consumer, where two containers 1 are erected. One is connected to transport means that can further convey granular material from the container and to the place of use, e.g. the feed trough in the stable. These transport means are not shown on the figure. When a container is empty, it is collected by a lorry 20 which moves the container 1 back to the feedstuff producer. Here, the container is checked and cleaned as described above, after which the container 1 is placed under a loading tube 21 from the production facilities 22. After finished filling and registering, the container 1 is moved to the store, illustrated by 23, where a plurality of containers e.g. may be arranged upon each other and side by side.

**[0084]** When a customer orders a delivery, or the automatic logistics system detects that a container at a consumer is to be exchanged, the correct container is taken out of the store and loaded upon a lorry 20, which brings the container to the unloading site of the consumer where the container is unloaded, after which the emptied container is carried with back to the place of production, and the cycle can then be repeated. The system may be connected to a central computer 24, which computer is connected with a modem unit 25, so that centrally in the computer it may be registered and monitoring may be effected by means of signals 26 transmitted from the production plant, the container, the lorry, the place of consumption and the store, respectively, so that at any time there is knowledge of as to which containers are uptilting which products, and where the container concerned is situated. With such a system it is possible centrally to control the logistics function whereby an improved production planning, stock control and distribution of goods may be ensured.

**[0085]** In Fig. 7, an arrangement according to the invention is illustrated, arranged in connection with the place of consumption. The container 1 is placed in immediate vicinity of an transfer device 27. Between the container 1 and the transfer device 27 there is provided means 28 for connection to the container. The means may e.g. consist of an air lock in which is provided a screw conveyor or, in cases where a walking-floor is provided in the full width of the container 1, the means 28 may deliver directly to the transfer device 27. Detectors provided in the transfer device detect the degree of filling in the attached transfer device 27 so that when the degree of filling reaches a certain minimum, a transport unit arranged in the container 1 is activated, so that more material is transferred to the transfer device. From the transfer device there is connection 30, e.g. in the form of a screw conveyor to the place of use. In practice, the material applied in this distribution system may be feedstuff for the farmers, wood chips for firing or any other kind of material in granular or pellet form.

**[0086]** The transfer device 27 may be arranged on weigh cells 32 so that continuously during emptying the container 1, it is registered how much material passes the transfer device, so that debiting the consumed material is invoiced according to the amount of material really delivered to the place of use, but the information may also be used for reporting, e.g. via a telephone mode 29, when a new container 1 is to be provided. By placing the transfer device on weigh cells it becomes possible to verify the transfer device as a sales balance, so that hereby is achieved an approved weighing process for invoicing the material delivered.

**[0087]** In Fig. 7, the container 1 is illustrated as standing on fixed or separately adjustable legs. Hereby several advantages are achieved. Among others, in connection with the place of use only there is to be provided a largely horizontal surface for putting up the container, and thus no special measures are needed for receiving the container. Furthermore, the container may be elevated slightly above the terrain, or even by different setting of the adjustable legs 33, there may be provided inclination inside the container down towards the connecting means 28, so that the material inside the container 1 will have a tendency to slide towards the outlet.

## Claims

1. A container for use in a traceable distribution system for granular/pellet-shaped material, including particularly animal feed, **characterised in that**

- external dimensions of the container (1) are within international standard dimensions;
- an outlet funnel (6) with connecting means to an external transport system (27) and means for opening and closing access to the interior of the container (1) are provided at one end;
- an interface is provided with which a control unit may activate a transport unit (17,28) provided in the lower side for internal transport in the container (1) of the granular/pellet-shaped material;
- in the interior of the container there is arranged at least one sensor for detecting the temperature and/or the air humidity of the container, the sensor communicating with a modem to a central computer, which in respect of the received input may communicate back to the container in order to respond to the input;
- at least one electronic identification means for identifying the actual container is provided on the container,
- a disinfection system is arranged inside the container and is connected to the modem, the disinfection system capable of being activated via the modem and a central computer (24); and
- the sensor and the disinfection system are connected with a control circuit.

**2.** A container according to claim 1, **characterised in that** the transport unit (17,28) within the container is a walking-floor, Redler, conveyor belt or screw conveyor.

**3.** A container according to claim 1, **characterised in that** support legs (33) are provided in the same long side as the transport unit for supporting the container at a given height over a horizontal plane.

**4.** A container according to any preceding claim, **characterised in that** longitudinal side walls (10) are arranged within the container (1), the side walls forming an angle of about 60° with horizontal.

**5.** A container according to any preceding claim, **characterised in that** at a long side of the container (1), there is provided a hatch (7) extending largely over the entire length of the container (1) and at least one third of the height of the container.

**6.** A contaiuncr according to any preceding claim, **characterised in that** the disinfection system is provided as a spray system with one or more nozzles inside the container, that the nozzles are connected via hoses to an external reservoir, and that pressure may be established in the nozzles of the reservoir hoses so that an agent may be atomised inside the container.

**7.** A container according to claim 6, **characterised in that** the pressure is formed by connecting the spray system to a source of pressurised air, and that the agent atomised in the container is a disinfectant, e. g. an ion powder.

**8.** A container according to any preceding claim, **characterised in that** the interior of the container (1) may be divided into separated chambers, each connected to common or separate means for emptying the container, and that the emptying means is one or more transport units arranged lowermost in the container.

**9.** A distribution method for traceable distribution of a granular/pellet-shaped material including:

- at least two containers (1) according to any of claims 1 to 3;
- a transfer device disposed close to and in connection with the place of consumption, the transfer device having means for connecting to the container, wherein
- the transfer device has means for detecting and summing up how much material having been brought from the container and into the place of consumption;
- the transfer device has means for activating the transport unit (17,28) in the container as a function of the content of the transfer device;
- the transfer device has means for communicating with a central data registering system (24,25) and/or a container store;
- after emptying the container on the place of consumption, the container is brought to a container store, where electronic identification means on the container are detected and data are transferred to the central data registering system;
- the container is disinfected by activation of the disinfection system provided in the container,
- report of the disinfection triggers a ready-for-use report in the central data registering system, after which the container may be reused;
- filling of container occurs by simultaneous detection of material and/or mix batch number and container identification code and consumption address;
- the container is brought to the place of consumption and is connected to the place of consumption via the transfer device.

**10.** A distribution system, **characterised in that** the transfer device (27) is arranged on weigh cells (32) which are connected with the central data registering system via a modem.

**11.** A distribution system, **characterised in that** the

ready-for-use report after a number of registrations on the same identification number trigger a manual inspection and/or an internal and/or external container cleaning.

**12.** A distribution system, **characterised in that** registering of material and/or mix batch number and container identification code and consumption address activates a debiting system, whereby either an invoice is printed to the place of consumption or the account of the place of consumption is automatically debited as function of the registered amount of material transported from the container through the transfer device to the place of consumption.

**13.** A distribution system, **characterised in that** registering the electronic identification code of the container triggers a position indication for placing the container on the container store.

**Patentansprüche**

**1.** Behälter zur Verwendung in einem nachvollziehbaren Verteilersystem für korn-/kügelchen-förmiges Material, welches insbesondere Tierfutter umfasst, **dadurch gekennzeichnet, dass**
sich äußere Abmessungen des Behälters (1) innerhalb internationaler Standard-Abmessungen befinden;
ein Auslasstrichter (6) mit Verbindungsmitteln zu einem externen Transportsystem (27) und mit Mitteln zum Öffnen und Schließen eines Zugangs zu dem Inneren des Behälters (1) an einem Ende vorgesehen sind;
eine Schnittstelle vorgesehen ist, mit welcher eine Steuereinheit eine Transporteinheit (17, 28) aktivieren kann, welche in der unteren Seite für einen internen Transport des korn-/kügelchen-förmigen Materials in dem Behälter (1) vorgesehen ist;
in dem Inneren des Behälters wenigstens ein Sensor zum Erfassen der Temperatur und/oder der Luftfeuchtigkeit des Behälters angeordnet ist, wobei der Sensor über ein Modem mit einem zentralen Rechner kommuniziert, welcher in Bezug auf die empfangene Eingabe zu dem Behälter zurück kommunizieren kann, um auf die Eingabe zu antworten;
wenigstens ein elektronisches Identifizierungsmittel zum Identifizieren des eigentlichen Behälters auf dem Behälter vorgesehen ist;
ein Desinfektionssystem im Inneren des Behälters angeordnet und mit dem Modem verbunden ist, wobei das Desinfektionssystem über das Modem und einen zentralen Rechner (24) aktiviert werden kann; und dass
der Sensor und das Desinfektionssystem mit einer Steuerschaltung verbunden sind.

**2.** Behälter nach Anspruch 1, **dadurch gekennzeichnet, dass** die Transporteinheit (17, 28) innerhalb des Behälters als Laufband, Redler, Förderriemen oder Schneckenförderer ausgebildet ist.

**3.** Behälter nach Anspruch 1, **dadurch gekennzeichnet, dass** Trägerfüße (33) in der selben Längsseite wie die Transporteinheit zum Tragen des Behälters in einer vorbestimmten Höhe über einer horizontalen Ebene vorgesehen sind.

**4.** Behälter nach wenigstens einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** in Längsrichtung verlaufende Seitenwände (10) innerhalb des Behälters (1) angeordnet sind, wobei die Seitenwände einen Winkel von ungefähr 60° mit der Horizontalen bilden.

**5.** Behälter nach wenigstens einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** an einer Längsseite des Behälters (1) eine Luke (7) vorgesehen ist, welche sich weit über die gesamte Länge des Behälters (1) und wenigstens über ein Drittel der Höhe des Behälters erstreckt.

**6.** Behälter nach wenigstens einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Desinfektionssystem als Sprühsystem mit einer oder mehreren Düsen im Inneren des Behälters vorgesehen ist, dass die Düsen über Schläuche mit einem externen Reservoir verbunden sind und dass ein Druck in den Düsen der Reservoirschläuche derart aufgebaut werden kann, dass ein Mittel im Inneren des Behälters atomisiert werden kann.

**7.** Behälter nach Anspruch 6, **dadurch gekennzeichnet, dass** der Druck durch Verbinden des Sprühsystems mit einer Druckluftquelle gebildet wird und dass das in dem Behälter atomisierte Mittel ein Desinfektionsmittel ist, beispielsweise ein Ionenpulver.

**8.** Behälter nach wenigstens einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Innere des Behälters (1) in getrennte Kammern aufgeteilt werden kann, von denen jede mit einem gemeinsamen oder separaten Mittel zum Entleeren des Behälters verbunden ist, und dass das Entleerungsmittel als ein oder mehrere Transporteinheiten ausgebildet ist, welche in dem Behälter zu unterst angeordnet sind.

**9.** Verteilverfahren für eine nachvollziehbare Verteilung eines korn-/kügelchen-förmigen Materials mit:

wenigstens zwei Behältern (1) gemäß einem der Ansprüche 1 bis 3; und mit
einer Übertragungseinrichtung, welche nahe zu dem Verbrauchsort und in Verbindung mit

dem selben angeordnet ist, wobei die Übertragungseinrichtung Mittel für eine Verbindung mit dem Behälter aufweist;

wobei die Übertragungseinrichtung Mittel zum Erfassen und Hochrechnen aufweist, wie viel Material von dem Behälter und in den Verbrauchsort gebracht worden ist;
wobei die Übertragungseinrichtung Mittel zum Aktivieren der Transporteinheit (17, 28) in dem Behälter als eine Funktion des Inhaltes der Übertragungseinrichtung aufweist;
wobei die Übertragungseinrichtung Mittel für eine Kommunikation mit einem zentralen Datenregistriersystem (24, 25) und/oder einem Behälterspeicher aufweist;
wobei der Behälter nach einer Entleerung des Behälters auf dem Verbrauchsort zu einem Behälterspeicher gebracht wird, an welchem elektronische Identifizierungsmittel auf dem Behälter erfasst werden und Daten zu dem zentralen Datenregistriersystem übertragen werden, wobei der Behälter durch Aktivierung des Desinfektionssystems, das in dem Behälter vorgesehen ist, desinfiziert wird;
wobei ein Bericht über die Desinfizierung einen Fertig-zum-Gebrauch-Bericht in dem zentralen Datenregistriersystem einleitet, nach welchem der Behälter wieder verwendet werden kann;
wobei ein Füllen des Behälters bei einem gleichzeitigen Erfassen einer Material- und/oder Mischladungsnummer und eines Behälteridentifizierungscodes und einer Verbrauchsadresse auftritt; und
wobei der Behälter zu dem Verbrauchsort gebracht wird und mit dem Verbrauchsort über die Übertragungseinrichtung verbunden wird.

**10.** Verteilersystem, **dadurch gekennzeichnet, dass** die Übertragungseinrichtung (27) auf Wägezellen (32) angeordnet ist, welche mit dem zentralen Datenregistriersystem über ein Modem verbunden sind.

**11.** Verteilersystem, **dadurch gekennzeichnet, dass** der Fertigzum-Gebrauch-Bericht nach einer Anzahl an Registrierungen auf der selben Identifizierungsnummer eine manuelle Inspektion und/oder ein internes und/oder externes Behältersäubern einleitete.

**12.** Verteilersystem, **dadurch gekennzeichnet, dass** eine Registrierung einer Material- und/oder Mischladungsnummer und eines Behälteridentifizierungscodes und einer Verbrauchsadresse ein Belastungssystem aktiviert, wodurch entweder eine Rechnung zu dem Verbrauchsort gedruckt wird oder wodurch die Abrechnung des Verbrauchsotres automatisch als Funktion der registrierten Menge an dem Behälter über die Übertragungseinrichtung zu dem Verbrauchsort übertragenen Material belastet wird.

**13.** Verteilersystem, **dadurch gekennzeichnet, dass** eine Registrierung des elektronischen Identifizierungscodes des Behälters eine Positionsindizierung zum Anordnen des Behälters auf dem Behälterspeicher einleitet.

**Revendications**

**1.** Conteneur destiné à être utilisé dans un système de distribution traçable pour des produits sous forme de granulés/pastilles, y compris en particulier des aliments.pour animaux, **caractérisé**

- **en ce que** les dimensions extérieures du conteneur (1) sont comprises dans les dimensions standard internationales ;
- **en ce qu'**un entonnoir d'écoulement (6) comportant des moyens de raccordement à un système de transport externe (27) ainsi que des moyens pour ouvrir et fermer l'accès à l'intérieur du conteneur (1) sont prévus à une extrémité ;
- **en ce qu'**il est prévu une interface, avec laquelle une unité de commande peut activer une unité de transport (17,28) prévue dans le côté inférieur pour un transport interne dans le conteneur (1) des produits sous forme de granulés/pastilles ;
- **en ce qu'**il est agencé, à l'intérieur du conteneur, au moins un capteur pour détecter la température et/ou l'humidité de l'air du conteneur, le capteur communiquant par un modem avec un calculateur central qui, au regard des données d'entrée reçues, peut communiquer en retour avec le conteneur afin de répondre aux données d'entrée ;
- **en ce qu'**au moins un moyen d'identification électronique destiné à identifier le conteneur en question est prévu sur le conteneur ;
- **en ce qu'**un système de désinfection est agencé à l'intérieur du conteneur et est raccordé au modem, le système de désinfection pouvant être activé via le modem et un calculateur central (24) ; et
- **en ce que** le capteur et le système de désinfection sont raccordés à un circuit de commande.

**2.** Conteneur selon la revendication 1,
**caractérisé en ce que** l'unité de transport (17,28) à l'intérieur du conteneur est un plancher mobile, un transporteur en masse, une bande transporteuse ou un transporteur à vis.

**3.** Conteneur selon la revendication 1,
**caractérisé en ce que** des pieds de support (33) sont prévus sur le même côté longitudinal que l'unité de transport pour maintenir le conteneur à une hauteur donnée sur un plan horizontal.

**4.** Conteneur selon l'une quelconque des revendications précédentes,
**caractérisé en ce que** des parois latérales longitudinales (10) sont agencées à l'intérieur du conteneur (1), les parois latérales formant un angle d'environ 60° par rapport à l'horizontale.

**5.** Conteneur selon l'une quelconque des revendications précédentes,
**caractérisé en ce qu'**il est prévu, sur un côté longitudinal du conteneur (1), une trappe (7) s'étendant en grande partie sur toute la longueur du conteneur (1) et sur au moins un tiers de la hauteur du conteneur.

**6.** Conteneur selon l'une quelconque des revendications précédentes,
**caractérisé en ce que** le système de désinfection est prévu sous la forme d'un système de pulvérisation avec une ou plusieurs buses à l'intérieur du conteneur, **en ce que** les buses sont raccordées à un réservoir externe via des tuyaux et **en ce qu'**une pression peut être établie dans les buses des tuyaux du réservoir de façon à pouvoir pulvériser un agent à l'intérieur du conteneur.

**7.** Conteneur selon la revendication 6,
**caractérisé en ce que** la pression est formée en reliant le système de pulvérisation à une source d'air comprimé et **en ce que** l'agent pulvérisé dans le conteneur est un désinfectant, par exemple une poudre ionique.

**8.** Conteneur selon l'une quelconque des revendications précédentes,
**caractérisé en ce que** l'intérieur du conteneur (1) peut être divisé en compartiments distincts, chacun étant raccordé à des moyens communs ou distincts pour vider le conteneur, et **en ce que** les moyens de vidage sont une ou plusieurs unités de transport agencées le plus bas possible dans le conteneur.

**9.** Procédé de distribution pour une distribution traçable d'un produit sous forme de granulés/pastilles comprenant :

- au moins deux conteneurs (1) selon l'une quelconque des revendications 1 à 3 ;
- un dispositif de transfert disposé à proximité du lieu de consommation et en liaison avec celui-ci, le dispositif de transfert comportant des moyens pour le raccordement au conteneur, dans lequel
- le dispositif de transfert possède des moyens pour détecter et additionner la quantité de produit qui a été amenée du conteneur sur le lieu de consommation ;
- le dispositif de transfert possède des moyens pour activer l'unité de transport (17,28) dans le conteneur en fonction du contenu du dispositif de transfert ;
- le dispositif de transfert possède des moyens pour communiquer avec un système central d'enregistrement de données (24,25) et/ou un magasin de conteneurs ;
- après avoir vidé le conteneur sur le lieu de consommation, le conteneur est amené dans un magasin de conteneurs où des moyens d'identification électroniques sur le conteneur sont détectés et les données sont transférées dans le système central d'enregistrement de données ;
- le conteneur est désinfecté par activation du système de désinfection prévu dans le conteneur ;
- le rapport de désinfection déclenche un rapport prêt pour utilisation dans le système central d'enregistrement de données, après quoi le conteneur peut être réutilisé ;
- le remplissage du conteneur a lieu par une détection simultanée du numéro de lot du produit et/ou du mélange, du code d'identification du conteneur et de l'adresse de consommation ;
- le conteneur est amené sur le lieu de consommation et est raccordé au lieu de consommation via le dispositif de transfert.

**10.** Système de distribution,
**caractérisé en ce que** le dispositif de transfert (27) est agencé sur des cellules de pesée (32) qui sont raccordées au système central d'enregistrement de données via un modem.

**11.** Système de distribution,
**caractérisé en ce que** le rapport prêt pour utilisation, après un certain nombre d'enregistrements sur le même numéro d'identification, déclenche une inspection manuelle et/ou un nettoyage interne et/ou externe du conteneur.

**12.** Système de distribution,
**caractérisé en ce que** l'enregistrement du numéro de lot du produit et/ou du mélange, du code d'identification du conteneur et de l'adresse de consommation active un système de débit, au moyen duquel soit une facture est imprimée pour le lieu de consommation, soit le compte du lieu de consommation est automatiquement débité en fonction de la quantité enregistrée de produit transporté du conteneur au lieu de consommation par l'intermédiaire

du dispositif de transfert.

**13.** Système de distribution,
**caractérisé en ce que** l'enregistrement du code d'identification électronique du conteneur déclenche une indication de position pour placer le conteneur sur le magasin de conteneurs.

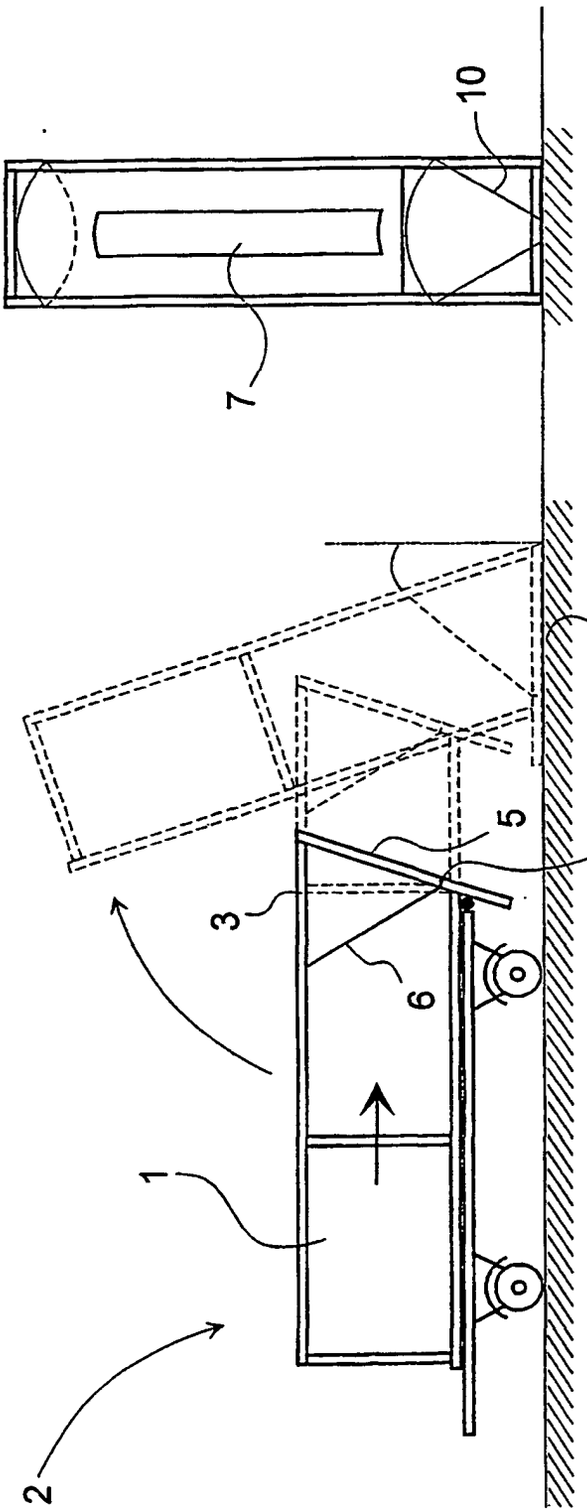



Fig.1b

Fig.1a

Fig.2a

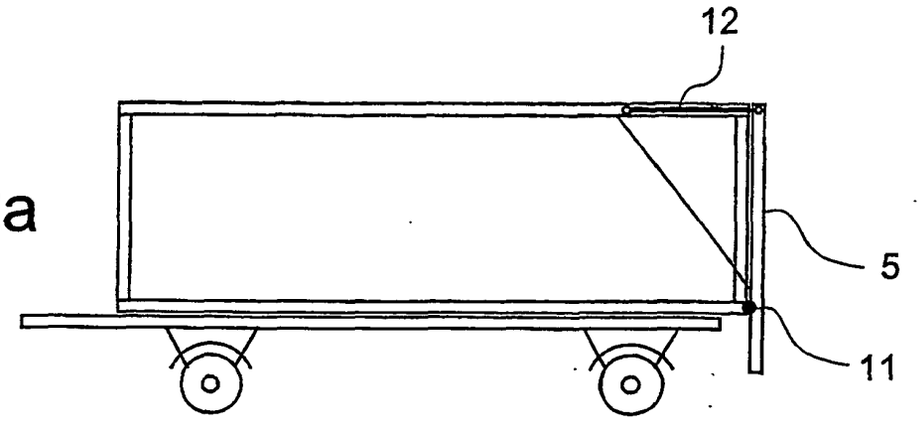



Fig.2b

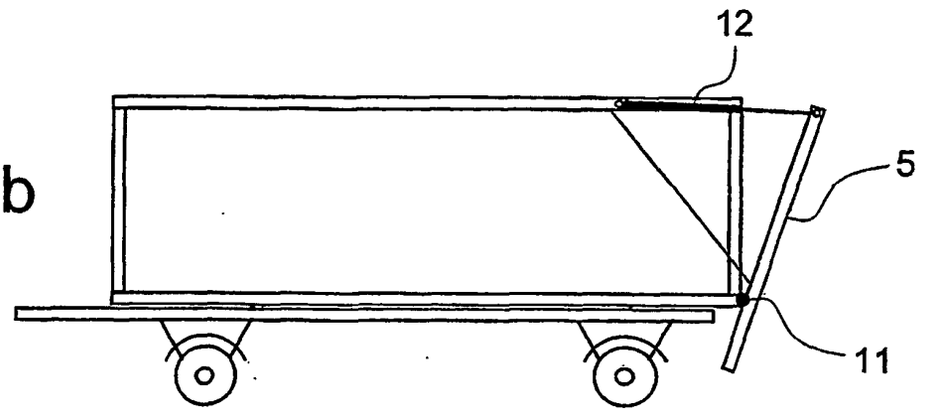
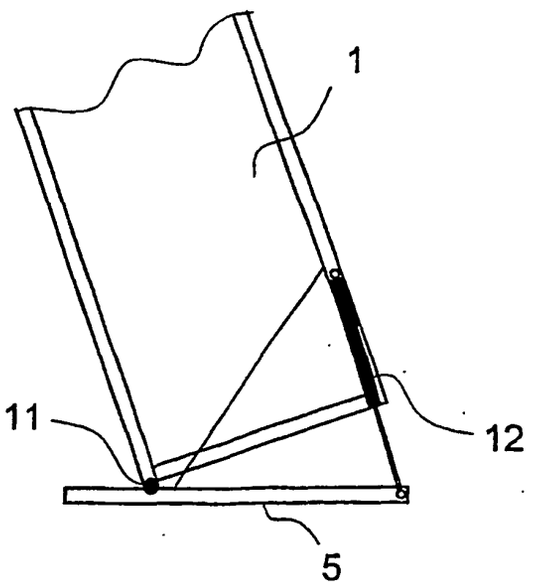



Fig.2c



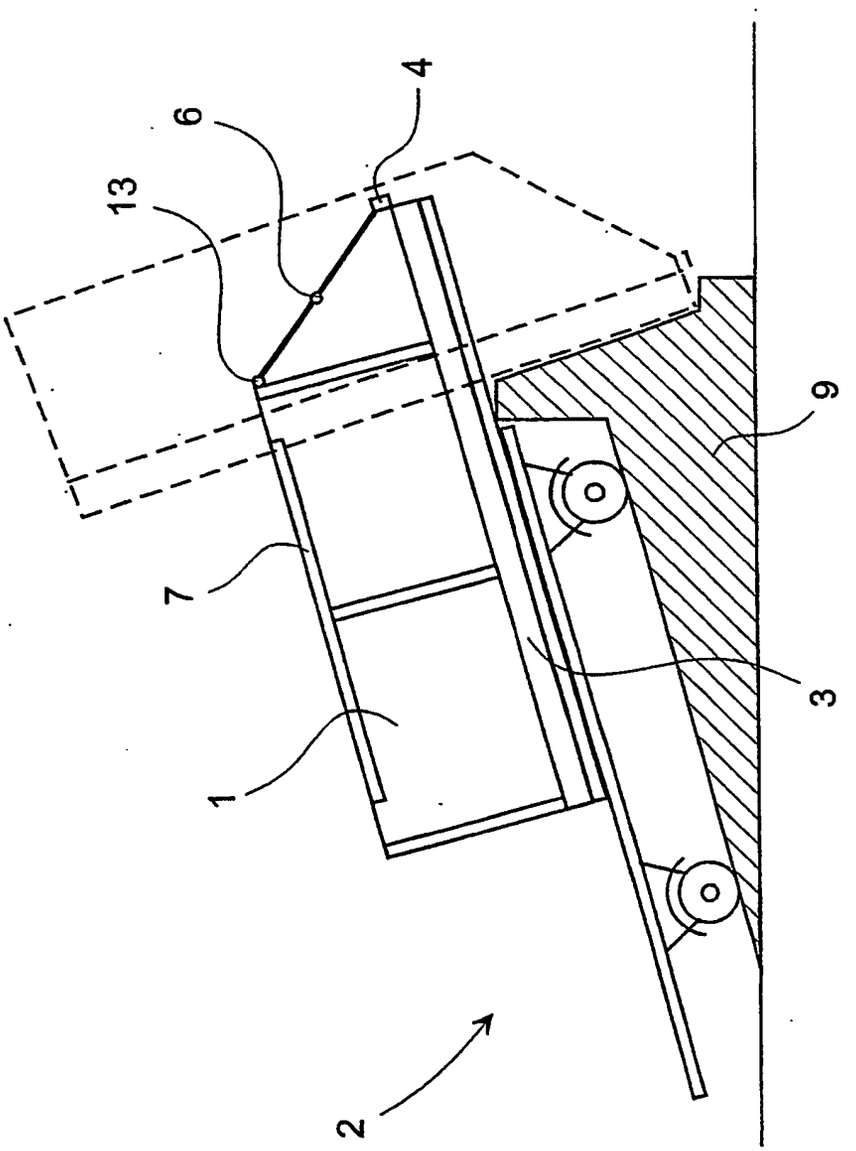
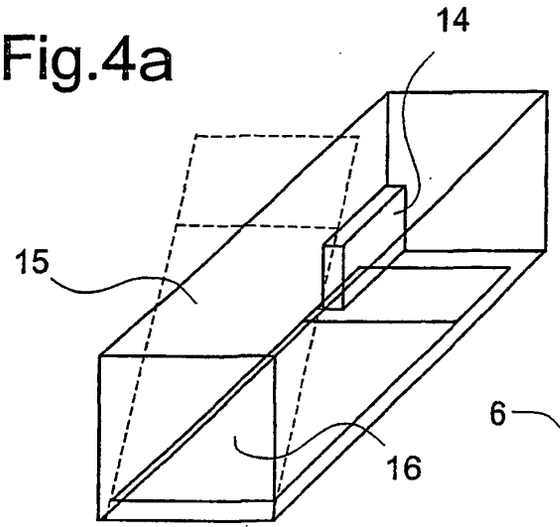



Fig.3

Fig.4a



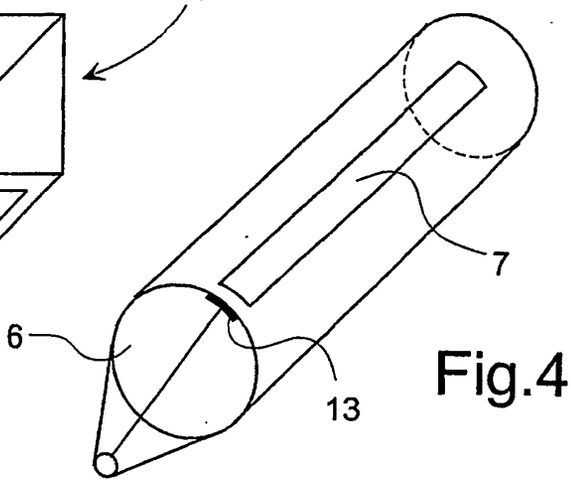




Fig.4b

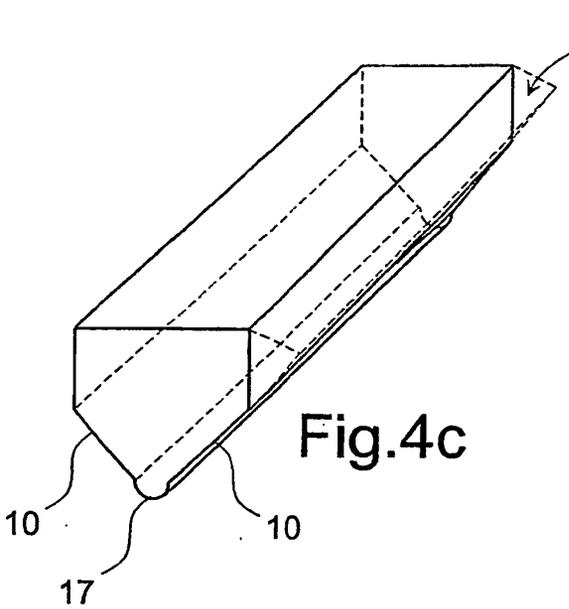



Fig.4c

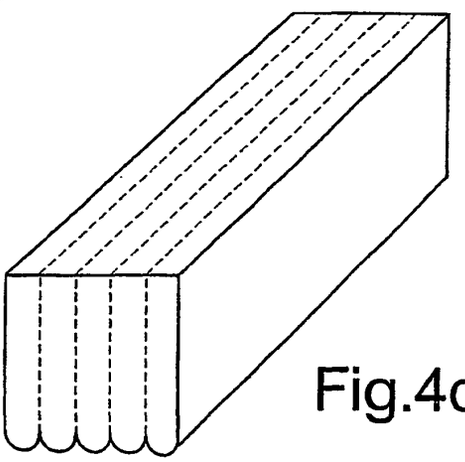


Fig.4d

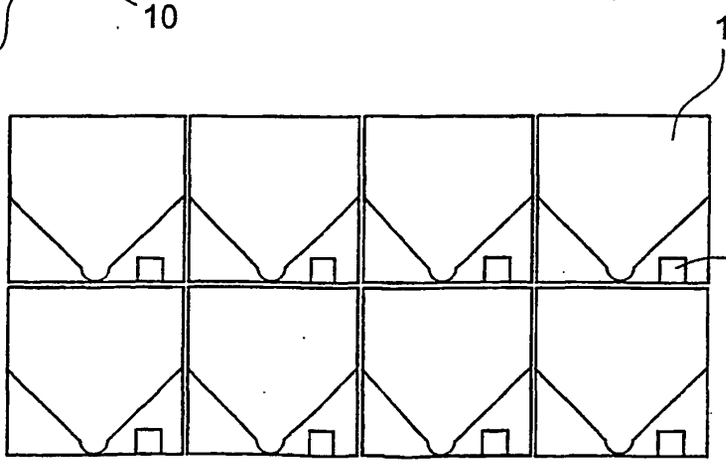



Fig.5

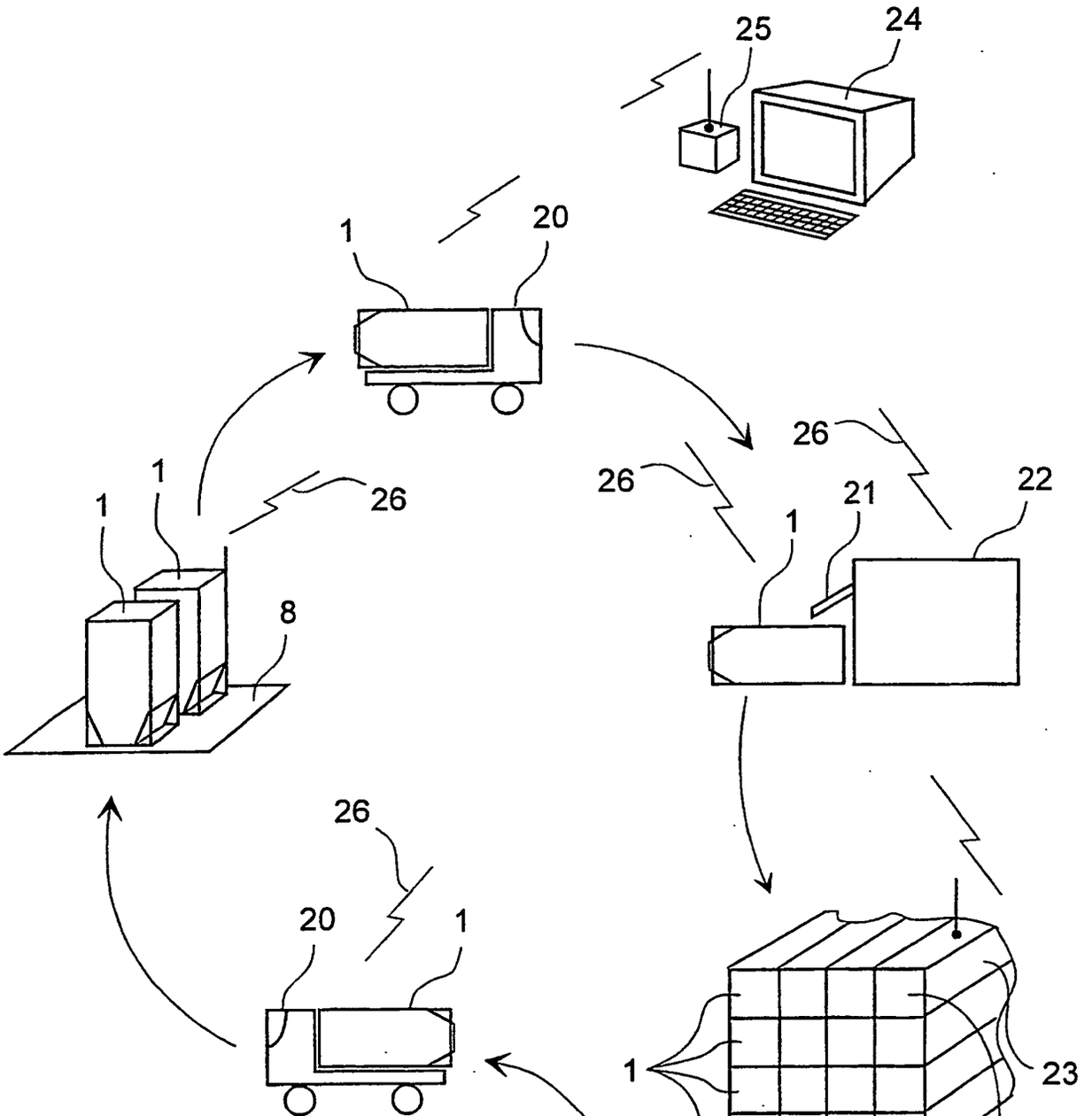



Fig.6

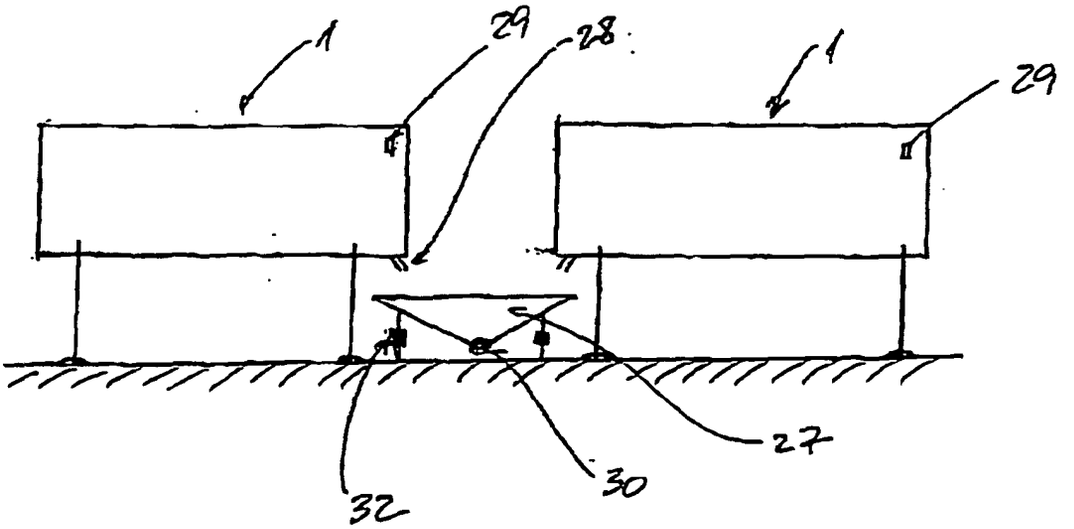



Fig. 7