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

(11) **EP 2 952 312 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
09.12.2015 Bulletin 2015/50

(51) Int Cl.:
B28C 7/04 *(2006.01)* ***B28C 7/16*** *(2006.01)*
B28C 9/04 *(2006.01)*

(21) Application number: **15466004.7**

(22) Date of filing: **24.04.2015**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA

(30) Priority: **24.04.2014 CZ 20140283**

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(54) MOBILE DEVICE FOR A PREPARATION OF A CONCRETE MIXTURE

(57) The mobile device for producing a concrete mixture consists of frame (14) provided with chassis (15) or frame (14) formed for connection with chassis (15), wherein on this frame (14) is disposed at least one binding agent reservoir (11) and at least one filler reservoir (10). With the frame (14) is connected also the mixing device (1). The binding agent reservoir (11) and also the reservoir of filler (10) are equipped with screw feeders for supplying filler and binding agent into mixing device, whereas the mixing device (1) is disposed between filler reservoir (10) and binding agent reservoir (11), and the filler reservoir(10) is disposed at one end of the frame (14).

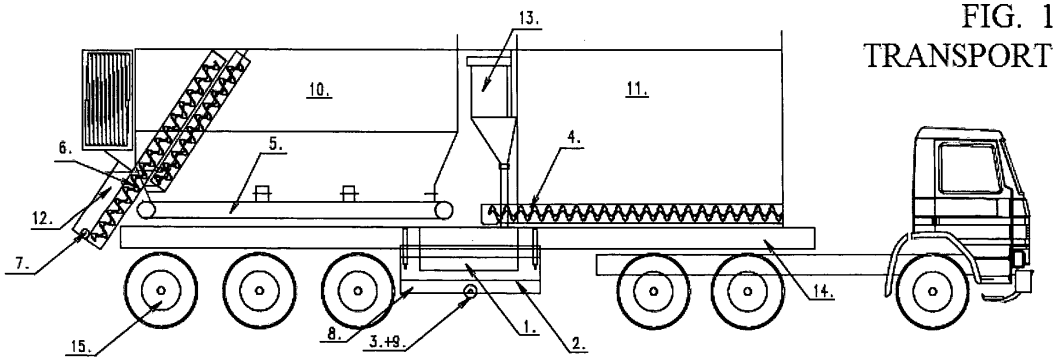

FIG. 1
TRANSPORT POSITION

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Description

Technical Field

[0001] This invention deals with a mobile device for producing a concrete mixture. The term concrete mixture for the purposes of this invention should be understood as any mixture produced by mixing filler with a binding agent, which besides the concrete mixtures includes also anhydrite mixtures, foam concretes, cement mixtures and the likewise products. The binding agent is advantageously especially a cement and anhydrite, but also other materials, which when mixed with filler in a mixing device, lead to forming a mixture capable of hardening, just likes the concrete and the like. The term filler according to this invention means mainly a sand and / or a gravel aggregate.

State of the art

[0002] There are currently several types of mobile mixing devices for production of different types of concrete mixtures, including the anhydrite and cement mixtures and other mixtures, all of which, as already mentioned, for simplification in the following description are included under a uniform term of "concrete mixture". Mobile devices for producing a concrete mixture are positioned on a truck chassis or are made in the form of a semi-trailer; all these devices have a common feature, which is the mixing device of concrete mixture disposed in the rear of the vehicle or semi-trailer.

[0003] There are known mobile devices for a production of concrete mixtures, which have reservoirs of a filler and cement, or other binding agent, adapted for their lifting, similar to lifting the platform of lorries or semi-trailers during the unloading, for the purpose of feeding the material by gravity into the feeding devices. An example of such a device is a product sold under the tradename TransMix Brinkmann, the company belonging to business group Putzmeister Mörtelmaschinen GmbH. In most mobile devices for the production of concrete mixtures, in which the reservoirs are lifted, the material into the mixing device is dosed, e.g. in case of the binding agent via a short screw feeder, or in case of the filler by a short belt, a screw feeder or other device directly from reservoir located on the lifted technology, with which the reservoir is firmly connected. The mixing device is located in the back of a truck or semi-trailer and is thus arranged during lifting of the relevant part of the mobile mixing device together with the reservoirs undermost. A disadvantage of this arrangement is that the amount of filler is substantially limited by a capacity of the reservoir of the filler, because filling of the heavy filler into lifted reservoir during the operation of the mobile mixing device in terms of safety is practically excluded. Should it be necessary to produce a greater quantity of concrete mixture than what is enabled by the capacity of the reservoirs, it is needed to tilt back the section with reservoirs and to ensure their filling by special devices, such as a loader, hydraulic arm or the belt conveyor, but this induces increased production costs of produced mixture. Because in this type of mobile device for the production of concrete mixtures the gravel aggregate cannot be refilled in the working position, there are pauses necessary to refill the material and cannot be ensured completely continuous production of the concrete mixture. This reduces the productivity of labour and for example the quality of anhydrite floor is deteriorating. Therefore this type of mobile device is not able to produce more than 15 m3 of mixture, which is given by reserve of filler and binding agent, while the subsequent continuation of producing the concrete mixture is very complicated and also expensiveWhen larger amount of concrete mixture is required than it can be produced from the quantity in reservoirs on the lorry or semi-trailer and the above-mentioned special equipment for filling is not available, then the production of concrete mixture is ending and the vehicle, together with entire technology must move to the filling terminal, where raw materials are supplemented for a production of another 15 m3 of concrete. This procedure is very lengthy and expensive. Moreover, in such a case the production is limited by the availability of the filling terminal, especially its distance from the place of producing the concrete mix. This system essentially prevents effective production of anhydrite or concrete mixture in an amount greater than what can fit into reservoirs, which currently have the mentioned volume of 15 cubic meters. Another disadvantage of this device is a possibility of its use only in places where is possible to ensure the required lifting up of the technology and where there is no risk of tipping over the entire semi-trailer, like for example at a slope underlay. Another type of a mobile mixing device is such that the reservoir with material will not be lifted up and the material into a mixing device is dosed via a long feeder running below the entire reservoir. An example of this solution is a European patent application EP 2636499 A1 of 06/03/2013, which describes a mixing unit arranged on the chassis of a lorry, comprising one filler reservoirand one reservoir for cement. Underneath the reservoir of the filler and along its entire length is an outlet opening and consists of two parts, leaning to each other, thereby ensuring its continuous emptying. Under the filler reservoiris running a long feeder. The binding agent reservoir is arranged behind the filler reservoirand above a section of the technology of mixing equipment, which is disposed in the rear of the vehicle. The amount of produced concrete mixture also in this case is limited by the capacity of reservoirs, so without using a special technique for supplementing the filler and/ or the binding agent, again is possible to produce at most about 15 m3 of the mixture. It is important to realize that the maximum volume of filler on the lorry or semi-trailer is generally limited by the maximum permissible weight of the vehicle or semi-trailer, possibly by permitted loads on the axle. Due to the placement of filler reservoiris the procedure of refilling of filler substantially similar to that described

for the first type and requires special technology. The fact that in this mixing device the entire reservoir need not be lifted up, it does not present any substantial advantage for the possibility of ensuring the continuous production of larger volumes of concrete mixture. The only difference is that the addition of filler can take place in the working position. But it is virtually impossible to ensure filling of the filler into the respective reservoir without the use of additional devices that enable the refilling. The main advantage of not-lifted reservoir is the higher stability of the machine in working position, when the centre of gravity is positioned lower than in case of the lifted technology. However, there remain all difficulties associated with the production of large volumes at one construction site. Other similar mobile mixing devices are described in documents US 2007/0189109 or FR2982190, which also contain consecutively arranged reservoirs for filler and binding agent, in case of FR2982190 even further possible reservoirs, with all the described disadvantages.

[0004] If we summarize the disadvantages of existing devices, then in case of technologies that use lifting of reservoirs with filler it is the danger of tipping over when the reservoir is in lifted position, limited choice of the working place; for some situations this technology is completely inappropriate (egg. the failure to lift the reservoirs to the desired height due to the presence of obstacles); filling of the filler can be effected only in the rest position, which may cause problems with the quality of the produced concrete mixture in continuous production above the capacity of reservoirs, which is usually 15 m3. For supplementing of filler is then required a special technique, e.g. excavator, combination with belt unloader, loaders etc., resulting in increased costs and the need for additional space around mobile devices; in some countries, the special devices are virtually unavailable. Last, but not less important it is a small reserve of binding agent for continuous production and consequently the need of frequent refilling with consequent increased costs spent on the operation of further techniques, e.g. cistern with binding agent etc..

[0005] After evaluation of aforesaid disadvantages of known mobile devices for producing concrete mixtures it is evident that they can be summarized into the following headings:

a) in case of production of larger quantity of concrete mixture than can be produced from the reservoirs, is necessary the presence of special techniques for supplementing of filler such as e.g. excavator, combination with a belt unloader, loader, etc., which results in increased costs and the need for additional space around the mobile mixing device. Additionally, in some countries, this special technique is hardly available;

b) as a result of having to transport filler, due to the maximum possible loading of the wheels of semi-trailer, or the permitted total weight of the entire set, is possible only a relatively small reserve of binding agent, usually only about 6 cubic meters, which is a problem in the continuous production or in the production of an amount of mixture larger, than can be produced from the transported quantity of binding agent. In such situations it is necessary a frequent refilling of the binding agent and are induced increased costs for the operation of further techniques, such as a cistern with cement, etc.

c) Increased loading of the rear axle due to the presence of a heavy mixing device in the rear

d) a small reserve of filler or binding agent.

e) problems with continuous production above 15 m3 including problems with quality of final product.

Subject of the Invention

[0006] According to this invention is submitted a mobile mixing device whose essence and advantageous features are described in the attached demands. In the production of concrete mixture in a mobile device for the production of concrete mixture according to this invention is preceded as follows: Before the arrival of mobile mixing device for the production of concrete mixture to the construction site is filled the binding agent reservoir, either from a silo with binding agent or from a cistern. Then is filled the reservoir of filler, advantageously by means of a loader, which is faster, or using the filling device, which is part of the technology.

[0007] Upon arrival at the building site the mobile device for producing concrete mixture is unfolded into the working position so that the reservoir of finished mixture is lowered, for example hydraulically, until the mixing device is positioned on strain gauge transducers, thereby allowing to detect the weight of individual components of the concrete mix, if their precise quantity is required, given for example by the type of concrete and the like. It is obvious that the dosage of individual components of the concrete mix may be performed by any suitable method commonly used in the preparation of concrete mixes, so the presence of the strain gauge transducers and positioning on them before start of preparing the concrete mix is not absolutely necessary and is herein mentioned only as an advantageous solution. If necessary, also the receiving reservoir of automatic filling gravel aggregate is unfolded, where according to another preferred embodiment of this invention the appropriate part of the receiving reservoir, including the filling screw feeder is lowered onto the ground, for example, again by using hydraulics, and individual walls of reservoir are unfolded, for example mechanically, so that a lorry with gravel aggregate can drive rearward, up to the reservoir and unload the gravel aggregate into receiving reservoir . By two oblique screw feeders the gravel aggregate will be transferred into the filler reservoir. The oblique screw feeders are fed by two horizontal worm feeders.

[0008] When initiating the production the concrete mixture the amount of the individual components is specified

in the recipe for desired concrete mix, which is advantageous and common in this technical field. The order of dosing the individual components is optional and is preferably given by the recipe and the corresponding technological process for producing of the given mix. The ingredients in this case are weighted in the mixing device, which is weighted. The control system first triggers the mixing device, then the screw feeder doses the binding agent into mixing device, until the entire required amount has been dosed. Afterwards or simultaneously (if permitted by technology), is dosed water - for example via a flow-meter. Finally, using a belt feeder or feeder of filler, the filler- mostly the gravel aggregate - is dosed into the mixing device. In the mixing device the concrete mixture is mixed up and then discharged to the reservoir of finished mixture, where it is mixed up using a stirrer. Finally, the finished concrete mixture conveyed from the reservoir for finished mixture to the destination, advantageously is continuously pumped with a pump and to the place of storage is transported by a hose, connected to this pump or is transported to the place of storage by using other devices. The hose can be 150 m long. After draining the finished concrete mixture from the mixing device into the reservoir of finished mixture below it, the entire process of producing further mixture keeps repeating: filling the mixing device gradually with individual components of the concrete mix, their mixing and discharge of the mixture into the reservoir.

[0009] After ending the production of mixture, first is drawn off all produced concrete mixture, then all parts of the mobile mixing device that came into contact with the produced concrete mixture are thoroughly washed with water, best with pressurized water.

[0010] The advantages of the mobile device for the production of concrete mixtures according to this invention are especially as follows:

- allows continuous filling of reservoir of fillers in working position
- the reservoirs thanks to the symmetrical arrangement on the frame can be large enough, both for binding agent and filler, so their ratios can be flexibly changed according to the type of the job order and for smaller orders is not required ensuring the refilling.
- given the location of the filler reservoir on the end of the semi-trailer it is easy to install the own refilling equipment and ensure easy access to it for operation of refilling, thus allowing refilling of fillers without special equipment or the need for additional space and thus the operational costs are significantly reduced and the competitiveness is increased. Also the problem of what to do with the rest of filler has been eliminated, as it is transported away in reservoirs;
- large capacity of filler reservoirand sufficient performance of filling the reservoir with filler allows for continuous production of concrete mix, but with a simpler logistic of supplying, because there is no need for special equipment and deliveries of filler are ensured by conventional trucks with folding loading space. Shorter time of filling also reduces production costs thanks to short idle times of trucks that supply filler;
- large capacity of reservoirs allows different combinations of filling of the reservoirs according to the availability of resources of filler or binding agent for the construction and according to the needs of production
- better load distribution, since in the rear there is not the mixing device with the reservoir of the finished mixture.

Brief Description of Drawings

[0011] The invention will now be described in detail with reference to the attached drawings, in which:

Figure 1: a side view of an exemplary embodiment of mobile device for producing concrete mixture according to this invention, which in this example is arranged on the semi-trailer of a lorry, in the transport position,

Figure 2 : view of the mobile device for the production of concrete mixture from Fig. 1 from the side in the working position when it is ready for the production of concrete mixture,

Figure 3 : view of the mixing device of the mobile device for the production of concrete mixture from the Fig. 1 with the reservoir of finished mixture in the transport position,

Figure 4 is a similar view of the mixing device from the Fig. 3, but with the reservoir of finished mixture in the working position.

Examples of implementation of the invention

[0012] One of the possible examples of the embodiment is presented in Figure 1. Mobile device for the preparation of the concrete mixture in this embodiment is arranged on the chassis of a semi-trailer of a lorry. According to other embodiments, not illustrated herein, the mobile device can be arranged on the chassis of another suitable transport vehicle. An example of such a transport vehicle chassis is a lorry, trailer, railway carriage, etc. The mobile device for producing concrete mixture according to this invention may also be formed as an autonomous unit which can be loaded on an appropriately adapted vehicle with a chassis, for example, lorry, trailer, railway carriage, i.e. similarly, as are formed and loaded the cargo containers, waste containers, etc. However, the term chassis, as used in the following description it is to be understood in a general sense, as part of a means of transport, allowing its movement especially on solid or

cohesion-less surface.

[0013] In the Figure 1 a mobile device for preparation of concrete mixture is presented comprising a frame 14 with a chassis 15, a filler reservoir 10 provided at the end the frame 14 provided at the rear end of the semi-trailer, a binding agent reservoir 11 arranged at the opposite end of the frame 14 provided at the front end of semi-trailer, and a mixing device (1) arranged between the filler reservoir 10 and the binding agent reservoir 11. The front end and the rear end of the semi-trailer is here to be understood in relation to the point where the semi-trailer is attached to the truck providing the transport or to the driver's cabin, indicated as the front end of the vehicle. According to this invention, the filler reservoir 10 is arranged on the rear end of the semi-trailer on the ground of easy refilling of filler into the filler reservoir 10 during the operation of the mixing device, even if the semi-trailer remains attached to the truck. One of many advantages of the solution according to this invention is that the quantity of concrete mixture that can be produced in the mobile device for the preparation of the concrete mixture, is not limited by the size of the filler reservoir 10. It is important to note, that although the embodiment in the described example refers only to the mobile device according to the invention, arranged on the semi-trailer, the embodiment described herein refers also to a mobile device according to any of the above or other possible variants, namely to embodiment of a mobile device for production of concrete mix on the lorry, trailer, railway carriages, container, etc. The use of the term "semi-trailer" in the description is not meant in any limiting sense, because for the essence of the invention is irrelevant whether the mobile device is formed as a semi-trailer, trailer, railway wagon, container, etc., or whether even its part is a lorry or any other vehicle that allows for transfer of the whole technology to the desired location. As already mentioned, it is also possible to form the mobile device according to the invention being arranged on a separate frame without a chassis, when this frame, together with the mobile device arranged thereon according to the invention is loaded on a lorry and transported to the destination, where it is positioned on a suitable stand or even just on the floor. It is important to note that the arrangement of the filler reservoir 10 at the rear end of the semi-trailer allows for easy refilling of the filler, whose consumption in the production of concrete mixtures is the highest, for example by means of a refilling device, as described below, so no special loaders and similar equipment are necessary on the building site. The filler can be dosed into refilling device directly from the loading area of the lorry, if provided with tipping mechanism.

[0014] As is obvious from the following description of an embodiment of this invention, the arrangement of the filler reservoir at the back brings a number of benefits, first of all a simple construction of device to be used for refilling.

[0015] Further will be described individual parts of the mobile device for the preparation of concrete mixture according to this example of embodiment.

[0016] The filler reservoir 10 is advantageously provided with a volume of approx. 15 m3. The filler, as already mentioned, for the purposes of this application means gravel aggregate of various fractions, sand, but it also can be for example polystyrene which ensures good insulation properties and other materials that due to their characteristics may be used as filler. Here it is important to mention the fact, that although in this embodiment is only one reservoir of filler, it is of course possible to create a mobile device according to this invention with multiple reservoirs of filler, thus making it possible to prepare a concrete mixture by using several different fillers that are dosed into the mixing device 1 in accordance with the prescribed recipe for the production of the given concrete mixture. Likewise, the filler reservoir 10 can be provided as a reservoir for more fractions of filler. The filler reservoir 10, according to further advantageous versions of this invention can be provided with vibrators for complete emptying of the reservoir, convertible canvas for securing the material during transit, and for protection of materials, in particular filler, against adverse weather etc. These advantageous parts of the mobile device for the production of concrete mixture are not illustrated in the described examples of embodiment for easier understanding of the essence of the invention. The filler reservoir 10 can be advantageously provided with at least two flaps on the lower side at the outlet from the reservoir into conveyor, thereby offering the possibility of selection of the place for the filler reservoir 10, from which the filler will be dosed into mixing device 1, for example in the presence of several fractions in the reservoir. Further the filler reservoir10 can be equipped with a partition to ensure said fractions cannot be mixed together in their undesirable ratio. The number of flaps and/ or partitions can be different. Below the outlet, possibly also below the outlets from the filler reservoir10 is positioned a belt conveyor, advantageously a weighted belt conveyor, for dosing the filler into the mixing device 1. The number of belt conveyors can be different and instead of the belt conveyor can be used other suitable dosing devices, e.g. a screw conveyor, etc.

[0017] When the filler reservoir 10 has been completely filled by loader, the flaps prevent consumption of filler from such spaces of the filler reservoir 10, which are not filled by screw feeder 6. Advantageously will be emptied section of reservoir, which can be refilled by means of screw feeder 6 .Also load of dosing belt is considerably smaller, has dropped to one-third.

[0018] The filler reservoir 10 according to its preferred embodiment is provided with a filling device for refilling material / materials into filler reservoir 10, also during operation of a mobile device according to this invention, for example directly on the building site. It is of course also possible to fill the filler reservoir 10 by using a loader, excavator or other available techniques by pouring of filler from above, for example when filling filler reservoir 10 in sand pits, quarries and the like. By using the filling

equipment it is possible to refill filler reservoir 10 simultaneously with the ongoing production and without special equipment and the quality of produced concrete mixture is not in threat. The filler reservoir 10 is firmly fastened on the frame 8 of the semi-trailer. The filling device preferably consists of the receiving hopper 12 and two oblique screw feeders 6. The receiving hopper 12 is movable as it includes a drive mechanism, here advantageously a hydraulic cylinder, allowing movement up - down into the folded - unfolded position and the lower pair of oblique screw feeders 6, which fills the second, upper screw feeder 6, which is not movable. To the receiving hopper 12 belong two other horizontal screw feeders 7 which are responsible for filling the lower oblique screw feeder 6, so that the receiving hopper 12 is emptied completely. The receiving hopper 12 is advantageously adapted for emptying of filler from trucks of different brands and sizes (types) using a hand-folded adapters. Filling the filler reservoir 10 is as follows: After unfolding of the receiving hopper 12 the lorry with its platform will drive rearward , up to above the receiving hopper 12 and begins to spill out the filler into the hopper. Simultaneously start to operate two screw feeders, which start with transferring of filler into the filler reservoir 10. The lorry must stay there, until it is empty. Then the platform can be folded and the lorry can leave. In the event that the materials almost "run short" or their consumption has stopped, the horizontal screw feeders 7 are lowered and possible residue of filler from the corners of the receiving hopper 12 is emptied by them. Not only the screw conveyor, but also other technical methods can be used for refilling the filler.

[0019] The receiving hopper 12 in its folded position, intended for transporting, is pulled out into the upper position, and is folded into possibly most compact dimensions. In working position, i.e. the unfolded position, the receiving hopper 12 is leaned against the ground. The transition of receiving hopper 12 from the unfolded to the folded position and vice versa is ensured by a hydraulic cylinder or other suitable device that lowers the receiving hopper 12 down and ensures its tilting. In the transportation position it is advantageous to secure the receiving hopper 12 mechanically against its move into lower, i.e. unfolded, position. Movable oblique feeder 6, in particular a screw feeder, connected to the receiving hopper 12, will carry out filling of the second fixed oblique screw conveyor, connected to the filler reservoir 10, whereby the filler is transferred into this reservoir. The second oblique screw feeder is firmly fastened to the filler reservoir10 and is open at the lower part, so the filler leaves the screw conveyor as soon as possible and the power consumption is reduced. When in the filler reservoir 10 the amount of filler is sufficient to fulfil the order or when selecting the possibility of refilling the reservoir 10 from above, filling equipment in production needn't be unfolded.

[0020] If the mobile device according to this invention contains multiple reservoirs of filler, especially for multifractional mixtures or for several fillers, this device can be provided with more filling devices.

[0021] The binding agent reservoir 11 is formed for the storage of binding agent, which advantageously is the cement, anhydrite and the like. The binding agent reservoir 11 has a volume of approximately 15 m3, thereby enabling production of a sufficient quantity of concrete mix.

[0022] According to another preferred version, binding agent reservoir 11 is equipped with a device for refilling, which is advantageously the inlet tube, allowing connecting the hose from cistern with binding agent. As already mentioned, the arrangement of the binding agent reservoir 11 in front of the semi-trailer also ensures an even weight distribution on the semi-trailer, wherein the mixing device 1, arranged in the centre, further supports the uniform distribution of the weight on all wheels of the set. The binding agent reservoir according to another preferred embodiment of the invention is provided with a filter 13 for separation of the binding agent from the air that is released during refilling of binding agent and enters the reservoir 11; this is used particularly when refilling the binding agent from the cistern with anhydrite or cement. The filter 13 includes filter cartridges and is formed for air cleaning or vibration cleaning of these filters cartridges. The filter 13 is further provided in its lower part with a flap to capture the binding agent. Through this flap the excess of binding agent from the filter is emptied into the mixing device 1 during production. Advantageously the filter 13 is also used during the production of the concrete mixture, when dust, generated during filling the mixing device 1 with the filler is sucked through the filter, so it does not leak into the surroundings. Cleaning of filter cartridges and discharge of excess of binding agent into the mixing device 1 is performed preferably automatically or semi-automatically on the instructions of the operator, without requiring manual operator intervention, so eliminating physically demanding manipulation during manual mounting, dismounting and cleaning of filter systems. The binding agent reservoir 11 in this exemplary embodiment is fixedly mounted to the frame of semi-trailer; also the variant with a hydraulic lifting of this reservoir can be chosen as the screw feeders are short. The binding agent is dosed into the mixing device 1by means of screw conveyors. Refilling the binding agent reservoir 11 can be carried out simultaneously with the ongoing production of the concrete mixture.

[0023] The mobile device for the production of concrete mixtures according to its another preferred embodiment can be equipped with a reservoir of water, which is not illustrated in this example. The water reservoir according to a particularly preferred embodiment consists of two independent tanks that in this example of embodiment have the capacity 500 litres each and are interconnected. Water reservoirs are advantageously arranged in the space of a cut-out segment of filler reservoir and/or binding agent. Through the dosing valve the water is supplied to the mixing device 1. The amount of water needed for producing the concrete mixture can be weighted in the

mixing device 1or is measured by means of the flow measurement device, as is conventional in the preparation of concrete mixtures in known mixing devices. In case of the flow meter, the water can be supplied into mixing device 1 simultaneously with another material, which is weighted in the mixing device 1, because the weight of other material is easily computed by deducing the weight of supplied water. For use in winter conditions the water advantageously passes through a heater such as hydraulic oil reservoir, where it is heated. But if at the construction site there is a sufficient source of pressurized water , then the water reservoir needn't be present or needn't be used , because the mixing device 1 is filled with water directly from this source, of course when records about the quantity/weight of the added water are kept. If at the building site, there is no source of pressurized water with sufficient pressure, then water into mixing device(1) can be added by using a pump, which according to another preferred embodiment is a part of the equipment according to the invention.

[0024] The mobile equipment for the production of concrete mixture according to this invention and according to another preferred embodiment can be provided with a dosing device of additives for concrete mixtures and / or at least with scales for weighing additives to concrete mixture. These additives are used to achieve different specific properties of concrete mixture. Such additives are e.g. chemical additives, foam, fibres, etc. The dosage of additives to the concrete mixture is carried out directly into a mixing device 1 and according to one preferred embodiment is carried out so, that the chemical ingredients, stored e.g. in small containers, typically 20 to 50 litres, arranged e.g. on the frame 14, are dosed by pump or by gravity into the mixing device 1. The weights of added liquid chemical additives are advantageously measured using a special flow meter, but it is also possible to check the weight by weighing. For dispensing of foam there is used a foam generator. For dosing fibres into the prepared mixture for its reinforcement can be used dispenser of fibres, known from conventional applications. The devices for dosing additives do not fall within the essence of the invention and are given here only as examples of possible preferred embodiments of mobile device according to the invention, but are not meant in any limiting sense. Generally, it should be noted that the examples of embodiment only illustrate possible examples of using the invention in practice, but the scope of protection of this invention is defined only by the patent claims.

[0025] In the mixing device 1 there are the individual components of the mixture mixed up in cycles and the finished mixture is discharged via the outlet into the reservoir of finished mixture 2, which is positioned below the mixing device 1. The cycle of preparing the concrete mixture starts with filling the mixing device 1 with individual components of the mixture according to the given recipe followed by mixing them to create the concrete mixture and discharging the finished concrete mixture into the reservoir positioned below the mixing device 1. Then the cycle repeats - filling, mixing, discharge. The mixing device 1 is advantageously a single-shaft type and includes several mixing blades arranged on the shaft and is provided with a hydraulically or pneumatically operated spout. The mixing device 1 is advantageously provided with a weighing device for determining the weight of the individual components of the concrete mixture, which is most advantageously suspended on strain gauge sensors detecting the weight of the concrete mixture in order to determine the weight of the individual components by using known methods, e.g. methods analogous to those of the patent EP 1961539 for determining weight of components of the concrete mixture. For transportation, the mixing device according to the example of the embodiment is uplifted and it is ensured that strain gauge transducers are not burdened by vibration of the mixing device, incurred during the drive. In order to increase the performance two separate mixing devices in a side by side position may be advantageously used.

[0026] According to a preferred embodiment of the device according to the invention a finished mixture reservoir 2 is disposed below the mixing device 1 and consists at least of a container, e.g. in the form of a trough. The reservoir of finished mixture 2 according to the invention is not strictly necessary for operation of a mobile device, since of course it is possible to supply the concrete mixture directly from the mixing device 1, but is advantageous to ensure a continuous supply and coverage of time of production of the mixture in mixing device 1. The reservoir of the finished mixture 2 is advantageously formed so as to substantially surround the mixing apparatus for reducing space requirements, so during transport the reservoir of finished mixture is disposed around the mixing device 1, as its cover and occupies less space. At the bottom of the reservoir of finished mixture are an agitating auger 8 and a screw feeder 9 with a pump 3 of the finished mixture.

[0027] The whole reservoir of the finished mixture 2 according to one preferred embodiment is arranged on the hydraulic cylinders, by means of which is lifted to the transportation (folded) position or is lowered just above the ground into working (unfolded) position. It is of course possible to carry out lifting and lowering reservoir of the finished mixture by using another device, e.g. mechanical with manual or electric drive, etc. The upper part of reservoir of the finished mixture 2 is advantageously equipped with a strainer, which prevents the penetration of larger fractions or particles into the pump. The agitating auger 8, which for example consists of two counterrotating augers, but it is possible to use other appropriate solution, ensures agitation of the finished mixture; advantageously, the finished mixture is agitated continuously and at the same time shifted to the screw feeder 9. By means of the screw feeder 9 is filled the pump 3 of finished mixture, which further pushes the mixture via a hose to the processing site. Of course the finished mixture can be transported to the desired location from the

reservoir of the finished mixture 2 by another method, than the by pump 3. The finished mixture reservoir 2 ensures continuous flow of finished mixture into pump 3 of finished mixture, to which is connected the hose for transport the finished mixture (not shown) which for transport can be conveniently wound on a drum, like the hose for water supply into technology.

[0028] The aforesaid parts of the mobile device for the production of concrete mixture are located on the frame of the semi- trailer 14 and their respective actuators can be hydraulic, pneumatic or electric. In the exemplary embodiment as a drive source is advantageously used the engine of tractor of the semi-trailer, on which the mobile device according to this invention is placed. It is also possible, in case of installation of a mobile device according to this invention on a lorry; use the engine of this lorry. The mobile device according to this invention can also be equipped with an independent generator of electricity or with a drive of hydraulic pump, independent on the engine of tractor or lorry.

[0029] The advantages of the mobile device according to this invention, besides those already mentioned, are as follows:

1. The amount of material on the trailer is sufficient to meet the majority of orders - no need to refill materials.
2. The technology alone will supply a sufficient amount of binding agent and the filler will be supplemented at the building site and in case of larger orders - above 15 m3 of the mixture - its production can be ensured without the need for special mechanisms in refilling of filler.
3. The technology alone will supply a sufficient amount of filler and the binding agent will be supplemented at the building site and for larger orders, generally above 15 m3 mixture, the binding agent will be refilled from a cistern transporting binding agent so, that the cistern through a hose is connected to binding agent reservoir and binding agent is transported there by means of hose and transport pump.
4. The technology ensures refilling of the filler and binding agent at a construction site (for large orders) without the need of special mechanisms.

[0030] This variability in using technology facilitates planning of logistic of material flows for production and reduces the overall production costs.

[0031] Actual process of producing the concrete mixture in the mobile mixing device according to this invention is similar to that on other mixing devices. The mixing device is gradually filled with the individual components of the mixture, they are stirred and the resulting mixture is discharged into the reservoir of finished mixture, which is installed below the mixing device. From there, the mixture is pumped or otherwise transported to a place designated for storage.

[0032] The mobile device according to this invention , with the mixing device disposed between the reservoirs of the binding agent and filler, so advantageously the mixing device is located in the centre of frame, on which this device according to the invention is installed, has an advantage in providing the possibility to combine the advantages of different types of above mentioned known devices for production of concrete mixture, while reducing costs of operation and in particular eliminates the aforementioned drawbacks of these known devices for producing the concrete mixture.

List of referential markings:

[0033]

1. Mixing device
2. Reservoir of finished mixture
3. Pump of finished mixture
4. Screw feeder of binding agent
5. Belt feeder of filler
6. Oblique screw feeders of filler
7. Horizontal screw feeders of filler
8. Agitating auger
9. Screw feeder
10. Reservoir of filler
11. Binding agent reservoir
12. Receiving hopper of automatic filling of filler
13. Filter
14. Frame
15. Chassis

Claims

1. The mobile device for producing a concrete mixture consists of frame (14) provided with a chassis (15) or of a frame (14) provided for a connection with a chassis (15), wherein at least one binding agent reservoir (11) and at least one filler reservoir(10) are arranged on the frame (14), to the frame (14) also a mixing device (1) is attached, wherein the binding agent reservoir (11) and the filler reservoir (10) are provided with feeders for feeding filler and binding agent into the mixing device, **characterized in that** the mixing device (1) is arranged between the filler reservoir (10) and the binding agent reservoir (11) and the filler reservoir (10) is arranged at one end of the frame (14).

2. The mobile device for producing a concrete mixture according to claim 1, **characterized in that** the filler reservoir (10) is disposed at a rear of a semi-trailer or a lorry.

3. The mobile device for producing a concrete mixture according to claim 1 or 2, **characterized in that** filler reservoir(10) is provided with a device enabling refilling of the filler during the operation of the mixing

device.

4. The mobile device for producing a concrete mixture according to claim 3, **characterized in that** device enabling refilling comprises a fixed part connected with the respective filler reservoir and /or with the frame, and movable part provided in its lower part with a receiving hopper (12) and in its upper part the movable part is created for a transmission of the filler into the fixed part, the movable part being created to be lowered during the process of refilling of the filler.

5. The mobile device for producing a concrete mixture according to at least one of claims 1 to 4, **characterized in that** the binding agent reservoir (11) and also the filler reservoir (10) are provided with their feeders, arranged always at the bottom of the respective reservoir (10, 11) and that the mixing device (1) is disposed below outlets of these feeders.

6. The mobile device for producing a concrete mixture according to claim 5, **characterized in that** the feeders are designed as straight, advantageously parallel to the frame (14) for maximum capacity of reservoirs (10, 11), and that the reservoirs (10, 11) together with these feeders are arranged essentially above the frame (14), while the mixing device (1) is essentially disposed below the frame (14) for its refilling with binding agent and filler from reservoirs (10, 11).

7. The mobile device for producing a concrete mixture according to claim 5 or 6, **characterized in that** the mixing device (1) is provided with a discharge opening in its lower part and below the discharge opening a reservoir (2) of finished mixture is disposed, the reservoir (2) of finished mixture being formed as a trough and a case of the mixing device (1), wherein in the transportation position the reservoir (2) of finished mixture surrounds the mixing device (1) being designed to be lowered below the mixing device (1) in order to increase its volume, the finished mixture reservoir (2) being provided in its lower part with a stirring device (8) having a pump (3) of the finished mixture.

8. The mobile device for producing a concrete mixture according to at least one of claims 5 to7, **characterized in that** the mixing device (1) is arranged on the strain gauges for detecting the weight of the individual components of the concrete mixture and is equipped with a locking device for relieving the strain-gauge sensors when transporting or storing of entire device.

9. The mobile device for producing a concrete mixture according to at least one of claims 1 to 8, **characterized in that** on the frame (14) is further arranged a water reservoir, whose outlet opening leads into the mixing device for refilling it, and reservoirs of additives for dosing their contents into the mixing device (1) are provided therein.

10. The mobile device for producing a concrete mixture according to one of claims 1 to 7, **characterized in that** the mixing device (1) is provided with a dosing device of additives to the concrete mixture and /or with at least one weighing device of additives to the concrete mixture.

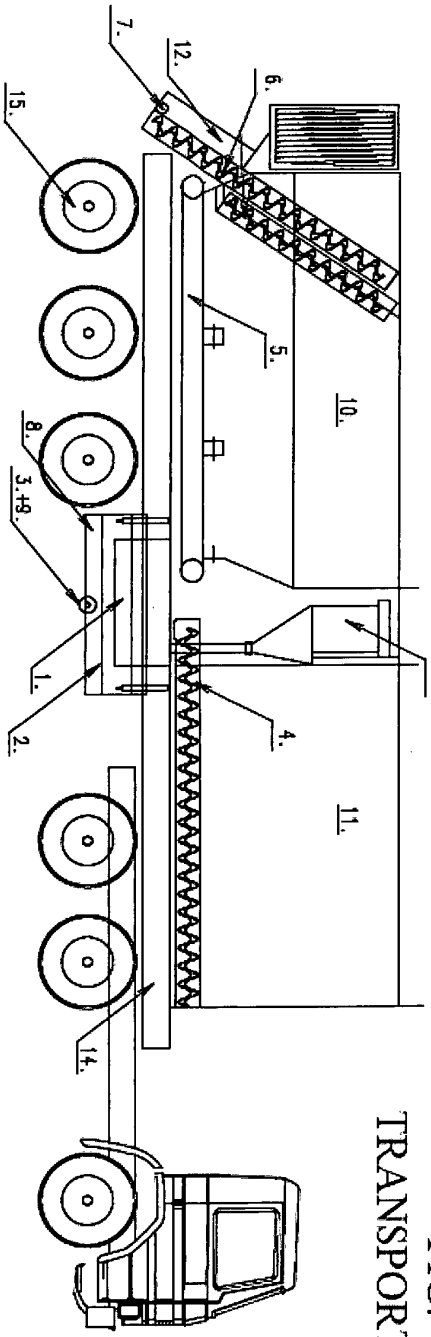

FIG. 1
TRANSPORT POSITION

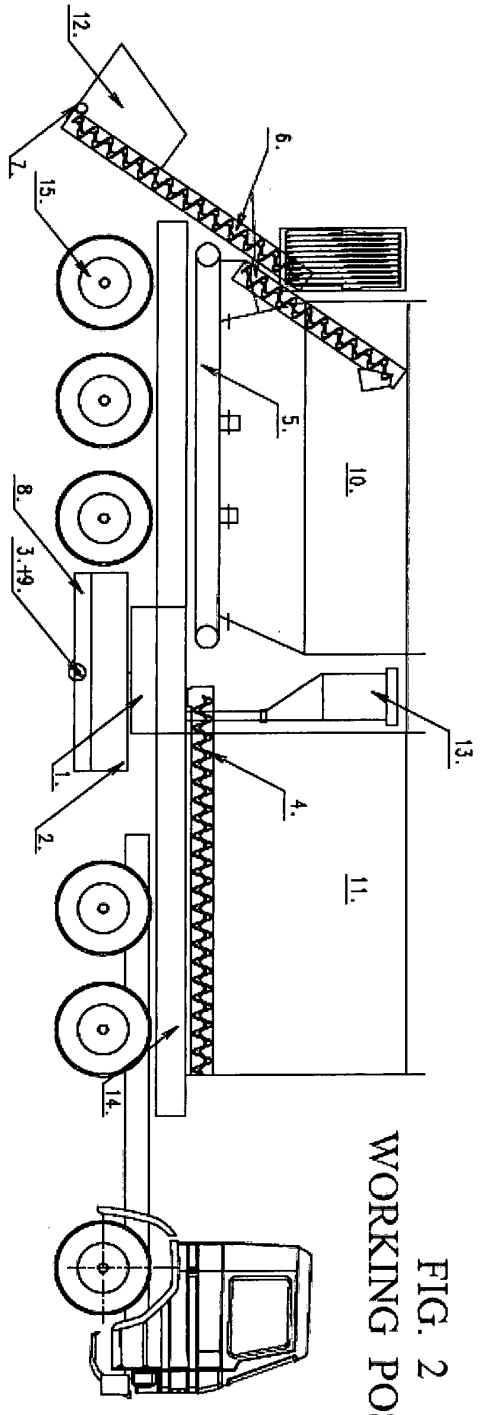

FIG. 2
WORKING POSITION

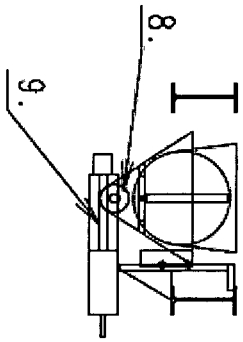

FIG.3
Transport position

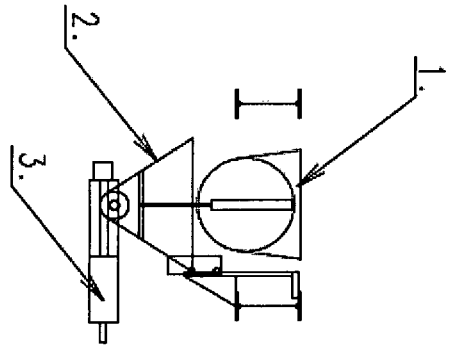

FIG. 4
Working position

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EUROPEAN SEARCH REPORT

Application Number
EP 15 46 6004

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	DE 196 31 312 A1 (GONNERMANN CLAUS [DE]) 5 February 1998 (1998-02-05) * column 3, line 64 - column 9, line 6; figures *	1-6,8-10 7	INV. B28C7/04 B28C7/16 B28C9/04
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TECHNICAL FIELDS SEARCHED (IPC)

B28C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 October 2015	Orij, Jack

CATEGORY OF CITED DOCUMENTS

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21-10-2015

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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