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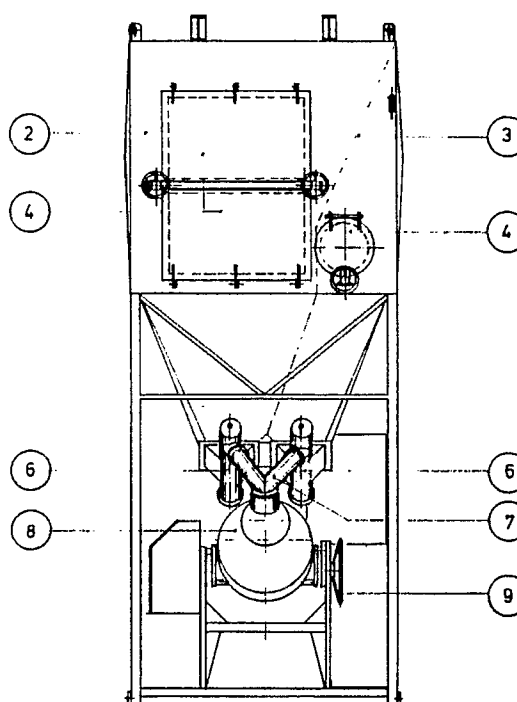
Process and apparatus for preparing a mixture, especially for mortar and other similar mixtures.

(57)

Process and apparatus for the preparation of concrete mortar and other mortar and similar mixtures at the work floor by means of a conveyable apparatus starting from separately stored aggregates and binder, wherein the materials are so dosed that the binder is kept separate from water and moist aggregate until the raw materials meet in the mixing drum, the water dosing taking place independently therefrom in the mixing drum. The dosing step and the mixing step are completely separated.

An apparatus for this process provided with at least two dosing screws (6) which extend in the mixing drum (8) without being fixed therewith, is indicated in figure 2.

FIG 2



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Process and apparatus for the preparation of a mortar, especially concrete mortar and similar mixtures

The invention relates to a process and apparatus for the preparation of a mixture, especially concrete mortar and similar other mixtures, in particular on the work floor by means of a conveyable apparatus.

It is known from FR-A-2357400 to prepare a mixture as indicated wherein a mobile silo is used for aggregate and binder, which are present in separate compartments within the silo, and the volumetric flows of non-predried aggregates and binder are mutually adjusted and the aggregates and binder are mixed while adding water. In EPA 0934793 a similar process and apparatus are described wherein the exit for the aggregates is provided with a conveyor screw, of which the axis also forms the axis in the mixing chamber, the exit of the binder chamber being provided with another conveyor screw, which screws both feed the material into the mixing chamber. These installations are rather elaborate and maintenance is not always easy.

This invention is directed to a process and apparatus by means of which on the work floor the above mentioned mixtures can be economically and reliably prepared.

It is an important object of the invention to provide a process and an apparatus according to which the aggregates and the binder can be kept separate both as to the process and the apparatus until they are fed into the mixing drum.

It is another object of the invention to provide a process wherein the water dosing occurs independent of the aggregates and binder dosing. It is a further object of the invention to provide a process for the preparation of the afore mentioned mixtures on the work floor using an apparatus which as such is easily conveyable.

It is a further object of the invention to provide an apparatus for the preparation of a mixture as mentioned, wherein the dosing system and the mixing drum are separate and the dosing system as well as especially the mixing drum can be easily cleaned.

Thus the invention in one aspect is directed to a process for the preparation of mixtures on the work floor by means of a conveyable apparatus which is characterized in that the dosing of the non-conditioned aggregates and the binder takes place by means of volumetric dosing wherein the volumetric dosing steps take place separately from the mixing, the water dosing taking place independently from the mixing step.

The invention further is directed to an apparatus comprising a silo having at the bottom part a suitable funnel like section, which silo contains com-

partments for the aggregates and binder, each compartment containing an exit opening, as well as a dosing system which is connected to a mixing drum, which is characterized in that the silo is provided with at least two dosing screws which run into the mixing drum without being fixed therewith.

In a particular embodiment the silo is provided with at least two dosing screws which run into a T-piece (or a triple piece) arriving in the mixing drum without being fixed therewith.

The advantages of the apparatus are its great reliability in that parts, like valves, weighing installations which are sensitive for technical troubles are avoided, the use of constructions with low maintenance, such as a mixer with open drum which can be easily cleaned. The cleaning of the mixing drum is facilitated in that the latter is open and completely separated of the dosing system and thus no demounting of parts is necessary for cleaning. The screw elements need not be cleaned according to this concept, except possibly for the open T-piece, which however is directly and easily accessible.

A further promotion of the reliability of the apparatus is provided by provisions for a good flow to the dosing screws by

a) choice of the angle of the silo compartments, e.g. 60 to 65° (the compartments may have different angles),

b) large flow openings, e.g. 375 by 500 mm passage (2x),

c) extension of the funnel in the filling opening of the dosing screw, which consequently is lying in the material,

d) the presence of a vibration basket enabling agitation of difficult material in the silo exit, especially sand.

e) a larger diameter for the screws, e.g. 150 mm,

f) no valve constructions on the dosing screws.

The mixing drum can also be used as a rotating storage vessel for a blend produced. This drum possibly is also suitable for adding other components or raw materials aside from the dosing screws, like colouring material, pigments, auxiliary materials etc. Further a visual observation of the blend during the mixing process is possible. The apparatus possesses based on the above items the advantages of easy accessibility and cleanability and easily operability by one man. The apparatus generally contains two sections for aggregates and binder but also three sections are possible. The apparatus is especially suitable for a preliminary silo, which e.g. directly feeds gravel into the mixing

drum, so that one directly may obtain a concrete blend. The preliminary silo preferably does not contain a baffle and is dosing as above mentioned a coarse aggregate or other agent directly in the mixing drum.

The apparatus contains provisions to promote the transport thereof.

The apparatus further is provided with charging provisions by means of access panels of the sections, which may be placed on a conveyor means in the horizontal position of the apparatus or under a load station in a vertical position and are filled. Thus the panels may be provided at the side or upper part or both.

In an advantageous embodiment the apparatus is provided at the lower frame with a carrying and tilting point which projects in such a way that the tilting angle (as hereafter defined) is smaller than the tilting angle of the truck. The tilting angle is understood to be the maximum angle over which the apparatus by means of guiding mechanism placed on the truck can be lifted. This angle should be such that when the apparatus is caused to slide on the ground it does not stand still but is tilting on its own in the vertical position. As the tilting angles for different trucks have different values it is of importance that the present apparatus already on its own by tilting reaches the vertical position at a tilting angle which substantially is below 90°.

The apparatus is so mounted that the point of gravity in empty and full condition is lying relatively low, which a.o. is reached by a square construction of the apparatus. In a preferred embodiment the apparatus thus has a square form. By the construction as mentioned and the choice of the tilting angle the apparatus as drawn is tiltable by a tilting angle of e.g. 68°, as above defined.

Furthermore the filling points of the apparatus are so constructed and the proportions and dimensions of the sections and the dimension of the silo are so chosen that one can use existing infrastructures for loading the raw materials, such as e.g. by concrete mortar stations, which may load truck mixers.

The water dosing suitably takes place by means of a water dosing valve controlled by a water measuring device, belonging to the apparatus.

The invention will be further illustrated by an embodiment referring to the accompanying drawing wherein:

figure 1 is an elevational view of the apparatus according to the invention, figure 2 is a front view thereof, figure 3 is a schematic side view of the apparatus with which only the tilting angle is shown. The apparatus comprises a transport frame (1) of which the upper part contains, the silo, the storage sections (2 and 3) for aggregates (e.g. sand) and binder (e.g. cement). The upper part

contains two filling openings (4) for the said materials, the largest opening being meant for the sand. In the discharge openings of the funnel a vibrating arm (5) with vibration motor is present to further the transport of the materials. The material arrives in the dosing screws (6) which themselves are in communication with the T-piece (7) that runs into the rotating mixing drum (8), without being mechanically coupled therewith, which mixing drum (8) is provided with a tilting mechanism (9).

In figure 3 the principle of the tilting angle is illustrated. The tilting line is found by determining the points of gravity of the silo in full condition, 2/3 full, 1/3 full and empty at the moment of tilting from the transport truck and drawing a curve there-though.

It can be seen that the centers of gravity of 1/3 loaded and 2/3 loaded in figure 3 are shifted to the left. One then draws a tangent along a curve connecting the points measured and determines the angle between the working line and the lower surface. This angle may not be greater than the tilting angle of the placing system at the transport means. In figure 3 further is indicated a tilting point which already at a tilting position of 68° is operable to tilt the apparatus in its vertical position.

It is to be understood that by the rigid separation of the dosing and mixing steps the total process can be carried out more flexible and one can more easily intervene when necessary. There are no problems with hardened contaminations which otherwise may be left in the parts, like the screws when the cleaning is not too extensive. Further it is easier to mix other materials in the mixer, while visual inspection remains possible. To counteract possible hardened foulings in the mouth of the T-piece the last part thereof is made of smooth, easily dischargeable material, like hard rubber, which minimizes the possibility of depositions and should they occur are easily removable.

Claims

1. Process for the preparation of a mixture, especially concrete mortar and similar mixtures at the work floor by means of a conveyable apparatus starting from separately aggregates and binder, characterized in that the materials are dosed in such a way that the binder is kept separate from water and moist aggregate until the raw materials arrive together in the mixing drum, the water dosing taking place independent thereof in the mixing drum.

2. Process according to claim 1, wherein the dosing step and the mixing step are completely separated.

3. Process according to claims 1-2, wherein

other additives, like pigments, auxiliary agents etc are directly fed in the open mixing drum.

4. Apparatus for carrying out the process according to one of the preceding claims, characterized in that it comprises a silo having at the bottom part a suitable funnel like section, which silo contains compartments for aggregates and binder, each compartment containing a discharge opening, as well as a dosing system in communication with a mixing drum, characterized in that the silo is provided with at least two dosing screws which run into the mixing drum, without being fixed therewith.

5. Apparatus according to claim 4, wherein the silo is provided with at least two dosing screws which end into a T-piece (or a triple piece) which runs into the mixing drum, without being fixed therewith.

6. Apparatus according to claim 5., wherein in the silo discharge a vibration basket is present.

7. Apparatus according to claims 4-6, wherein it is provided with a tilting point in such a way that the tilting angle (as defined) is suitable for a placing system.

8. Apparatus according to claims 4-7, wherein the open rotating mixing drum during operation is completely separated from the dosing system.

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FIG.1

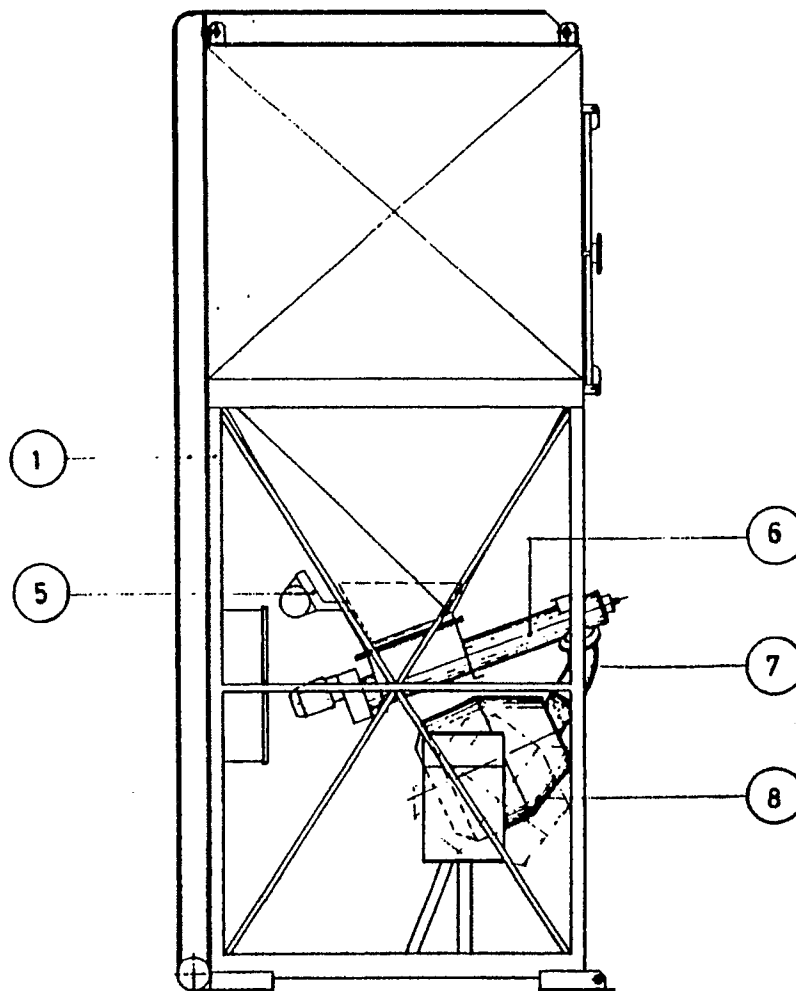


FIG. 2

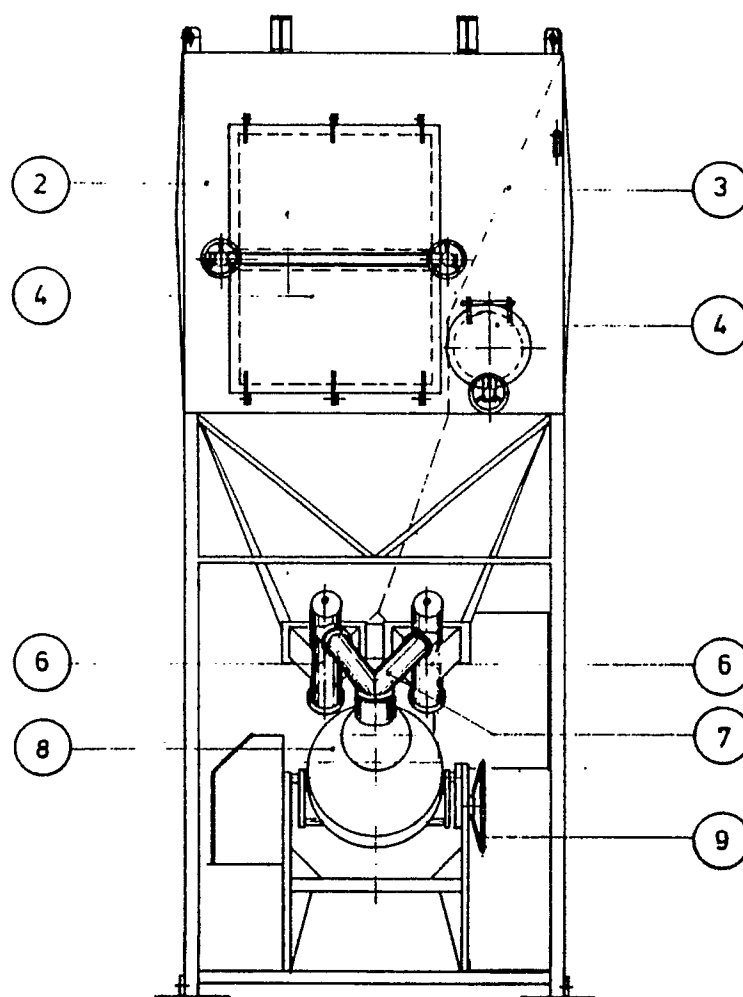
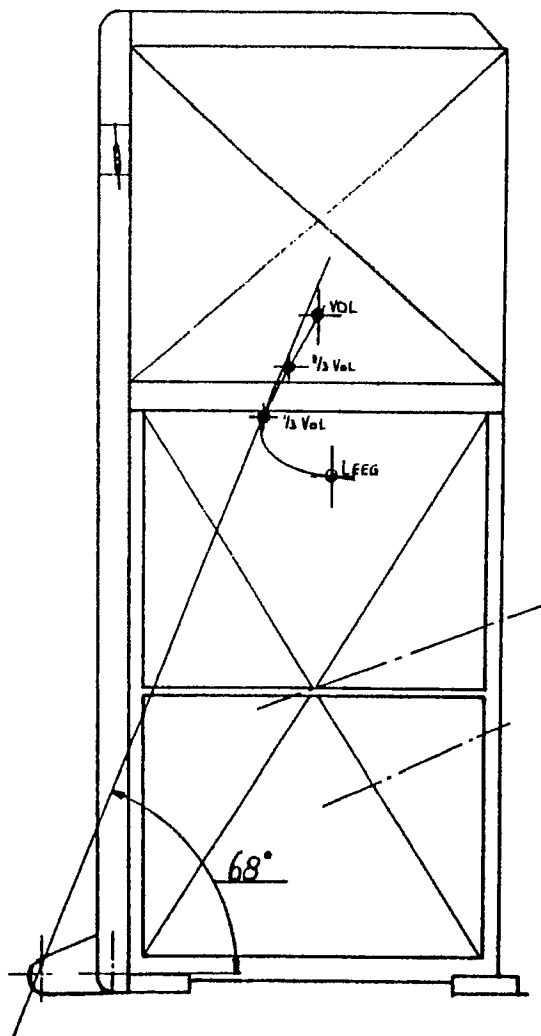


FIG. 3





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EUROPEAN SEARCH REPORT

Application Number

EP 90 20 0823

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	US-A-3 661 365 (CLOUD) * Abstract; figures *	1-3,8	B 28 C 9/04
X	DE-A-3 709 236 (SILO ESTRICH) * Whole document *	1,2,4,5	
A	FR-A-2 577 161 (WILDGRUBER) * Page 4, lines 15-20; figures *	6	
A	GB-A-1 083 830 (BALLMER) * Figures *	7	
A	US-A-3 891 193 (PERRY)		
A	GB-A-2 095 569 (KINGMASTER)		
A	GB-A-2 158 728 (D & H MATERIALS)		
A	US-A-2 031 326 (MILLER)		
A	GB-A-2 161 090 (LADWEIN)		
A	GB-A- 128 536 (CANDLOT)		
A	FR-A-1 482 209 (PELLAUTO-ELBA)		
A	EP-A-0 105 107 (MATHIS - SYSTEM)		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 28-06-1990	Examiner PEETERS S.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			