July 28, 1953 H. WALDVOGEL 2,646,975

METHOD FOR MIXING CONCRETE BY GRAVITATIONAL VIBRATION

Filed April 10, 1951

Fig. 2

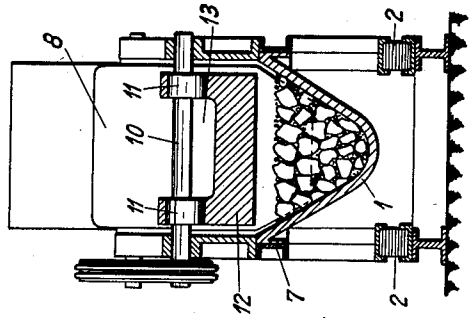


Fig. 4

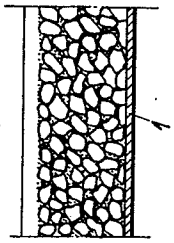


Fig. 3

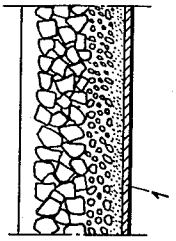
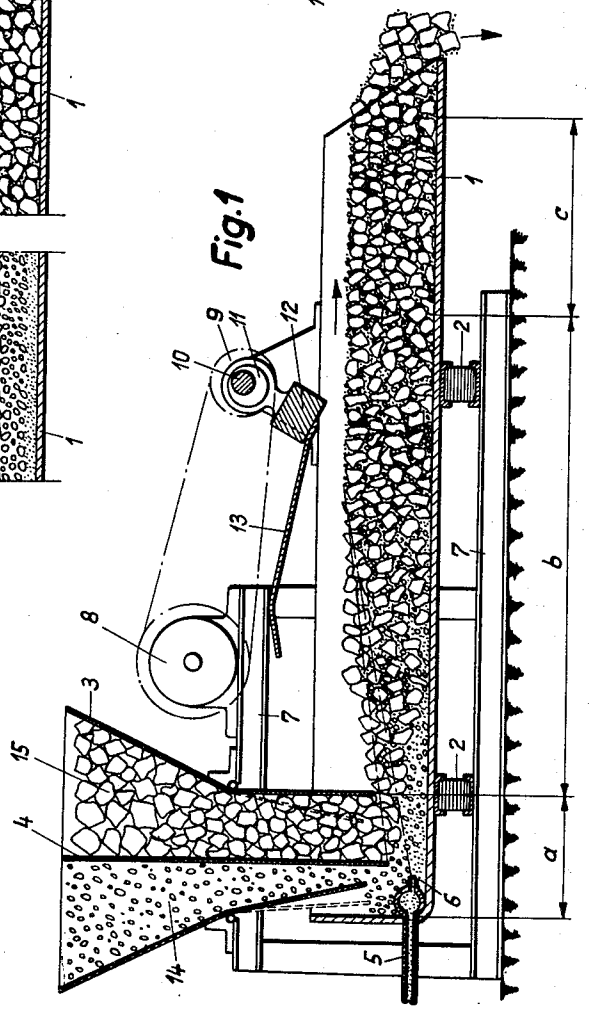


Fig. 1



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METHOD FOR MIXING CONCRETE BY GRAVITATIONAL VIBRATION

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3 Claims. (Cl. 259—149)

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The present invention relates to a method for mixing concrete, and is based on the observation that an intimate and absolutely uniform mixing of the different components of the concrete is obtained when these components are brought onto a vibrating carrier preferably in the sequence of their specific gravities. By suitable apportioning of the components it is possible to add exactly the quantity of cement, water and sand requisite for binding the gravel.

The concrete mixing machine for carrying out the method described according to the invention, comprises a vibrating carrier above which separate inlet means, for instance subdivided funnels, are provided for the separate components of the concrete.

The method according to the invention is now here explained with reference to the concrete mixing machine which is illustrated by way of example in the drawing and can be adopted for carrying out the novel method. In this drawing:

Fig. 1 shows a diagrammatic longitudinal section through the mixing machine,

Fig. 2 a cross-section and

Figs. 3 and 4 show sections through concrete layers before and after mixing respectively.

The illustrated machine comprises a shaker conveyor trough 1, which rests on flexible, spring supports 2. The shaker conveyor trough 1 has the parabolic cross-section that can be seen in Fig. 2. Above the shaker conveyor trough 1 is the inlet funnel 3, which is subdivided by a partition wall 4. This partition wall reaches down into the conveyor trough 1. At the left end (Fig. 1) of the latter, a supply pipe 5 is provided for cement milk, i. e. for a mixture of cement and water. The pipe 5 ends in a nozzle 6. On a stand 7 the driving motor 8 for the vibrating appliance 9 is fitted. This vibrating appliance comprises a rotating shaft 10, on which eccentric discs 11 are mounted. These latter serve to set the mass 12 into oscillating motion, In order to keep the mass 12 in the illustrated oblique position, any kind of guiding means can be provided. In the drawing, a tension member 13 attached to the sand 7 is shown diagrammatically.

The components of the concrete: water, cement, sand and gravel, are intimately mixed with each other by vibrating with the described machine, the separate components being introduced in the sequence of their specific gravities. Through the nozzle 6 cement milk is introduced

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as already mentioned, whilst the sand is introduced through the part 14 of the funnel at left of the partition wall 4 and the gravel through the part 15 of the funnel at the right. In consequence of this manner of admission, the sand mixed with cement milk, the lowest, is at the lefthand end of the conveyor trough, and the gravel lies above it. Fig. 3 shows a cross-section through the layers of materials at the lefthand end of the trough. Here then the materials are still in the sequence of their specific gravities. Now the vibrating causes the lighter components to pass upwards, whilst the heavier component, i. e. the gravel, passes downwards. Because of the vibrating, there is at the same time a conveying and a compacting of the material. If the components of the material have been properly apportioned in their quantities relatively to each other, the mortar on the surface of the mixture will just cover the uppermost particles of gravel. If the mortar does not reach up to the surface of the mixture after intense vibrating, the mixture contains too little mortar. On the other hand, if a layer of mortar forms above the gravel, there is an excess of mortar present.

According to this method, the mixing process itself determines the most suitable apportioning of the components to each other. The optimum quantity of the added substances can be determined and fed in the proper proportion.

When the material is passing from the feed place of the added substances to the outlet from the trough, the feed takes place along the distance *a*, the mixing along the distance *b* and a compacting of the concrete mix along the distance *c*, whereby it must be remarked that the processes of mixing, conveying and compacting are not sharply distinguished from each other by the above-mentioned partial distances, but overlap each other in continual development. During the conveying of the mix in trough 1, a steadily increasing mixing and compacting takes place.

By the parabolic shape of the mixing and conveying trough the mixing process is also favourably influenced. At the outlet position at the end of the mixing trough, a uniformly mixed and precompacted concrete will continually be given off. The exact reason for this effect is not certain, but trials have proven that the above effect is enhanced by the parabolic shape.

This new construction incorporates in it the advantages of the continuous mixer, and forms at the same time a compactor. With an execu-

tion which is very simple in design and economical in power consumption, a very high mixing performance can be attained.

What I claim is:

1. A method for making concrete including the step of bringing the various constituents of the concrete onto a vibrating carrier so as to form a composition on the carrier in which the components of lower overall weight are located at the bottom and those of higher overall weight are located at the top of the former.

2. A method for making concrete comprising bringing the various constituents of the concrete onto a vibrating carrier so as to form a composition in which the components of lower overall weight are located at the bottom and those of higher overall weight are located at the top of the former, mixing, conveying and compacting of the components taking place simultaneously by the vibrating of said carrier.

3. A method for making concrete comprising bringing the various constituents of the concrete

onto a vibrating carrier so as to form a composition on the carrier in which the components of lower overall weight are located at the bottom and those of higher overall weight are located at the top of the former, the components being brought onto the carrier in the sequence from lower to higher of their respective overall weights.

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