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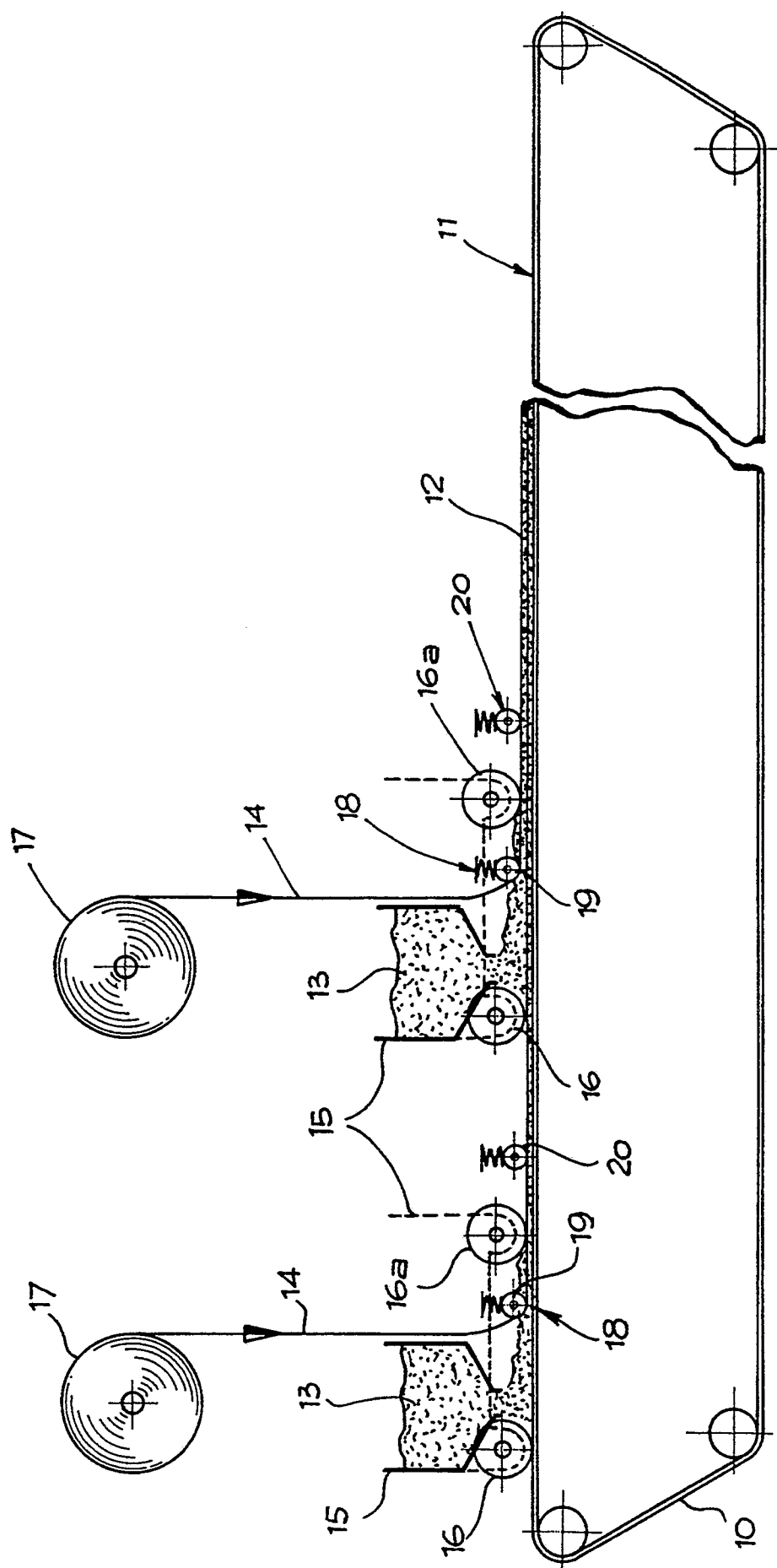
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54 **Equipment for making reinforced concrete slabs.**

57 The invention relates to equipment for forming concrete slabs with at least one reinforcement network. The cement mixture (13) is deposited on a conveyor belt (11) by a distributing hopper (15) with the use of spreading/banding rollers (16,16a). The reinforcement network (14) is placed on the cement mixture where there are smoothing rollers (16,16a) and at least one vibrating device (18) for improving the uniform impregnation of the reinforcement network in the cement mixture. The procedure can be repeated for forming multi-layered reinforced slabs.



The present invention relates to equipment for making concrete slabs with either a flat or corrugated surface, and including at least one fibrillated polypropylene network used for reinforcement and will subsequently be simply referred to as "reinforcement network".

Concrete slabs, even multi-layered, which have at least one reinforcement network are already available, as well as equipment for making these slabs from a cement mixture and reinforcement networks usually made of fibrillated polypropylene.

Equipment which is already in use includes a conveyor belt made of felt or the like, the top surface of which forms a plane on which a cement mixture is placed by a distributing hopper and with the auxiliary of associated spreading/banding rollers.

A reinforcement network which is to be impregnated and bound by the cement mixture will be placed onto the cement layer, downstream from said rollers. The impregnation of the reinforcement network is carried out through the use of a compacting guillotine, that being a blade with vertical movement, which forces the network to set in the cement matrix whilst a depression box removes the water from the mixture.

The procedure of distributing the cement mixture and of placing the reinforcement network is repeated along the conveyor belt for making multi-layered slabs when necessary.

However, the action of such intermittent compacting, though fast, allows for the possibility of differentiated thickness and/or for the variation of the cement mixture as well as not always consenting a uniform impregnation of the reinforcement network. All this could lead to the reinforcement network separating from the cement matrix of the manufactured article. In other words, the equipment which is available at the moment is not completely reliable and does not exclude the possibility of defects in the forming of the above mentioned slabs.

The present invention aims to solve these problems by improving conditions of each reinforcement network in the cement matrix, eliminating or at least reducing the above mentioned inconveniences so as to achieve a constant and satisfactory result.

All this is achieved by placing the reinforcement network directly in the zone wherein the cement mixture is delivered on the conveyor belt and by treating the network with a high frequency vibrating action before and eventually also after the levelling off or smoothing of the cement mixture layer.

Thus, the equipment here proposed for the forming of concrete slabs with at least one reinforcement network made of fibrillated polypropylene, comprises: a conveyor belt with a top surface used as a forming plane; at least one distributing hopper for depositing cement mixture onto

said plane; and spreading/banding rollers associated with the hopper to smooth the layer of cement on said plane, and it is characterized by means which place at least one reinforcement network in the cement mixture, where there are said spreading rollers and at least one vibrating device so as to improve the impregnation of the reinforcement network before and/or after the smoothing by the said rollers of the cement matrix layer.

An example of practical realization of the equipment in accordance with the invention is illustrated in the attached drawing and will be described in more detail.

In said drawing, the conveyor belt (10), made for example of felt or the like, has an upper surface (11) on which the slabs (12) even multi-layered, are made from a cement mixture (13) and reinforcement networks (14). The cement mixture (13) is put on the forming plane (11) through the use of a distributing hopper (15) and spreading/banding rollers (16, 16a).

A number of distributing hoppers (15) can be foreseen along the forming plane (11) so as to form as many layers which overlap and make multi-layered slabs. Reinforcement networks (14) designed to be impregnated in a corresponding layer of cement mixture are present wherever there is a hopper.

In accordance with the invention, controlling means (17) feed and place the reinforcement networks (14) onto the cement mixture (13) in a space between the rollers (16, 16a), that is to say before the levelling off or smoothing of the layer to be formed. The placing of the reinforcement network (14) is carried out with a high frequency vibrating device (18) which continuously moves the network, thus improving the impregnation of the cement matrix, before the completion and smoothing of the layer.

The vibrating device (18) advantageously includes a roller (19), perfectly finned and operated by means capable of making it vibrate so as to continuously shake the network which has to be impregnated in the cement mixture. The operation is then completed with the smoothing of the cement matrix by the roller (16a) so as to assure a correct interaction between the reinforcement network and the cement matrix in which it is impregnated.

If desired, the operation can be continued with the use of a second similar vibrating device (20), placed downstream from the smoothing roller (16a) in the direction of the movement of the conveyor belt. The second vibrating device can, when possible, further improve the impregnation of the reinforcement network.

## Claims

1) Equipment for forming concrete slabs incorporating at least one reinforcement network (14)

made of fibrillated polypropylene comprising: a conveyor belt with the top surface used as a forming plane; at least one distributing hopper of cement mixture deposit (13) on said plane; and spreading/banding rollers associated with the hopper to smooth the layer of cement on said plane, characterized in that there are means (17) for placing at least one reinforcement network (14) on the cement mixture where there are said spreading rollers and in that there is at least one high frequency vibrating device (18) so as to improve the impregnation of the reinforcement network at least before the smoothing by said rollers of the cement matrix layer.

2) Equipment as claimed in claim 1, characterized in that it also comprises an eventual second vibrating device (20) placed downstream from the spreading/banding rollers in accordance with the direction of movement of the conveyor belt.

3) Equipment as claimed in claim 1 or 2, characterized in that each vibrating device (18, 20) comprises at least one roller (19) and operating means to make said roller vibrate.

4) Equipment as claimed in claim 3, characterized in that the roller (19) of the vibrating device (18, 20) has a peripheral finning which continuously engages on the reinforcement network (13) to be impregnated in the cement mixture.

5) Equipment as claimed in claims 3 and 4, characterized in that it comprises a vibrating device (18) placed upstream from the smoothing roller (16a) of the cement mixture on the forming plane which is defined by a conveyor belt and a possible second vibrating device (20) placed downstream from said smoothing roller.

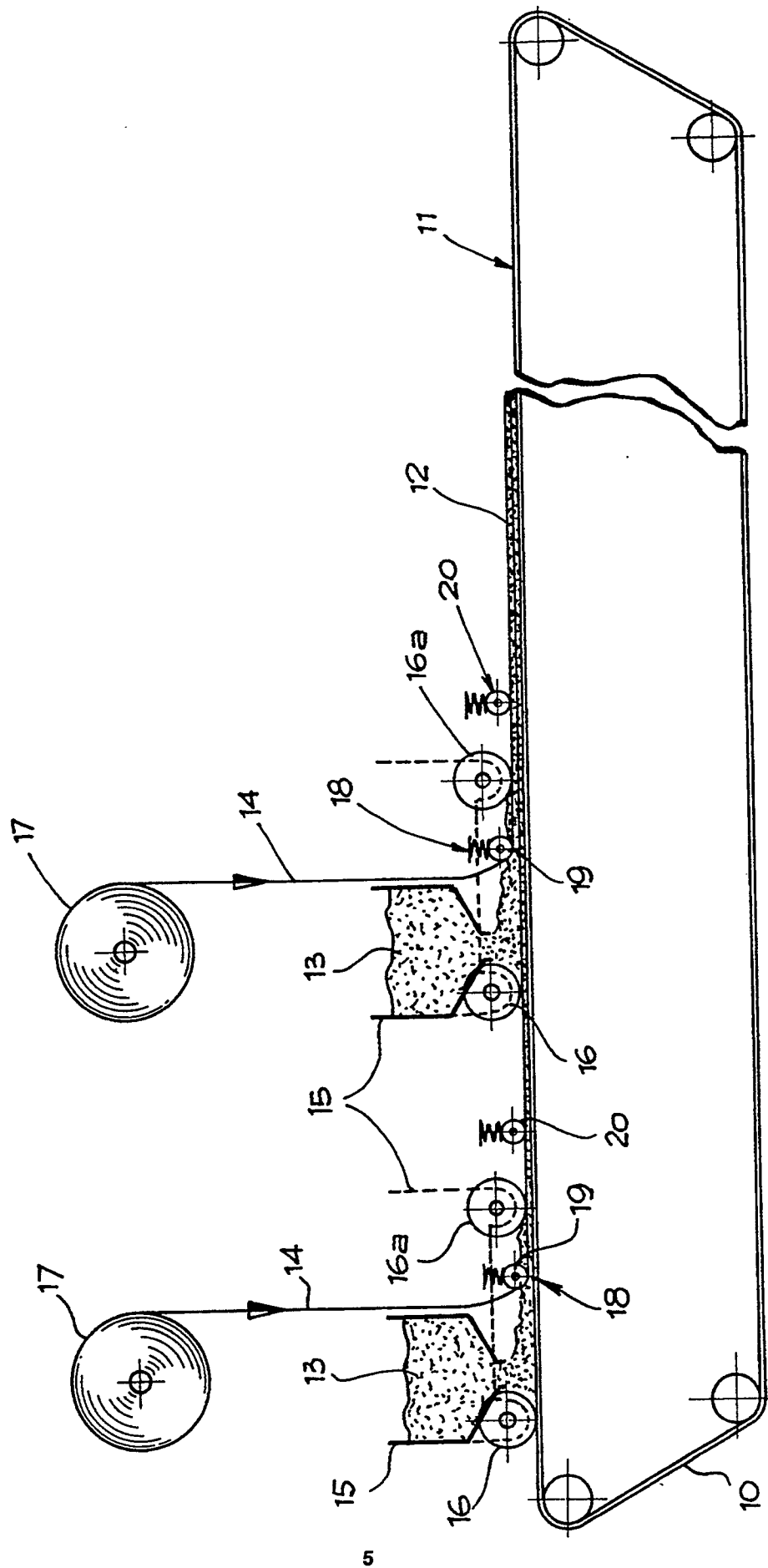
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# EUROPEAN SEARCH REPORT

Application Number

EP 91 83 0030

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	EP-A-0 021 362 (MONTEDISON S.p.A. - MOPLEFAN S.p.A.) * Whole document *	1,3	B 28 B 23/02 B 28 B 3/12
Y	* Page 12, line 13 - page 13, last line *	4	
Y	--- EP-A-0 192 208 (MOPLEFAN S.p.A.) * Figure 5 *	4	
A	* Figures 1,6; page 12, lines 9-20 *	1,2,5	
A	--- EP-A-0 095 943 (UNITED STATES GYPSUM CO.)	1	
A	--- DE-A-1 584 511 (H. KLAUE, Dr., Ing.)	1	
A	--- GB-A-2 159 066 (ARYAN GROUP LTD)	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 28 B B 29 C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23-04-1991	Examiner LANASPEZE J-P.Y.
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>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</p> <p>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</p> <p>* : member of the same patent family, corresponding document</p>			

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