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(54) **DEVICE FOR APPLYING A SLOT IN A POURED CONCRETE SLAB**

(57) Device for applying an elongated slot (1) in a concrete slab (3) to be poured in external formwork (2). The device comprises an elongated flexible expansion hose (4), closed at both ends, and connected at the sides to elongated slot formwork sideboards (5). By means of a pressure fluid, the expansion hose is inflated so that the slot formwork sideboards move away from each other to the desired distance (d). Then concrete is poured in the external formwork. After hardening of the concrete, the expansion hose is evacuated and the expansion hose and the slot formwork sideboards are removed.

EP 4 269 693 A1

Description

[0001] The invention relates to a device for applying a slot, in particular an expansion joint, in a poured concrete slab or structure, called concrete slab hereinafter.

[0002] The aim of the present invention is to provide a device for applying a slot in a poured concrete slab or structure, called concrete slab hereinafter, the aim of using said device being to save time and gain speed in the making of expansion joints etc., for example in concrete roads, cycle tracks, bridges, viaducts etc.

[0003] For this purpose, according to the invention, a device is provided that is intended and configured as an aid for applying an elongated slot or break, in particular an expansion joint, called slot hereinafter, in a concrete slab or structure, called concrete slab hereinafter, to be poured in external formwork,

> said device comprising an elongated expansion hose closed at both ends, made of flexible material, connected at the sides to elongated slot formwork sideboards, all this being arranged so that during use the expansion hose and the slot formwork sideboards connected thereto extend substantially horizontally in their longitudinal direction whereas the principal planes of both slot formwork sideboards extend substantially vertically;
> wherein the expansion hose is provided with at least one pressure fluid passage or coupling, intended and arranged for supplying and/or discharging a pressure fluid to or from the hose for the purpose of expanding the expansion hose by pumping the pressure fluid in, or relieving the expansion hose by pumping out or discharging the pressure fluid. The pressure fluid may be (compressed) air or may be formed by water or a (some other) hydraulic fluid.

[0004] The scope of protection of the present invention comprises both a device as stated above, as well as a method for applying an elongated slot or break, in particular an expansion joint, called slot hereinafter, in a concrete slab or structure, called concrete slab hereinafter, to be poured in external formwork, comprising the steps of:

- providing a base or bottom plate and external formwork;
- providing a device according to the invention and applying said device at the location of the intended slot;
- expanding by introducing the pressure fluid into the expansion hose, so that the elongated slot formwork sideboards move away from each other, until the distance between the external surfaces of the slot formwork sideboards that are turned away from each other substantially coincides with the intended width of the slot to be applied;
- pouring concrete in the external formwork on either side of the device according to the invention;
- leaving the poured concrete to harden;
- after the poured concrete has hardened, relieving the expansion hose and then removing the device according to the invention.

[0005] The invention will now be discussed further on the basis of the following description of the figures.

[0006] Figs. 1a-1f show an embodiment example of a device according to the invention, and illustrate the method according to the invention.

[0007] Figs. 1a-1f show an embodiment example of a device according to the invention, intended and arranged as an aid for applying an elongated slot or break, in particular an expansion joint, called slot 1 hereinafter, in a concrete slab or structure, called concrete slab 3 hereinafter, to be poured in external formwork 2 on a base or bottom plate 2a.

[0008] The device comprises an elongated expansion hose 4, closed at both ends, made of flexible material, connected at the sides to elongated slot formwork sideboards 5, for example by means of metal strips 6 on the inside of the expansion hose 4, and bolts 6a. The whole is arranged and configured so that during use of the device, the expansion hose 4 and the slot formwork sideboards 5 connected thereto extend substantially horizontally in their longitudinal direction (from front to back in Fig. 1) whereas the (innermost and outermost) principal planes of both slot formwork sideboards 5 extend substantially vertically (from bottom to top in Fig. 1).

[0009] The expansion hose 4 is provided with at least one pressure fluid passage or coupling (not shown), intended and arranged for supplying and/or discharging a pressure fluid, such as air or liquid, to or from the hose for the purpose of expanding the expansion hose 4 by pumping the pressure fluid in (see Figs. 1a -> 1b) or relieving the expansion hose 4 (see Figs. 1d -> 1e) by pumping out or discharging the pressure fluid. The pressure fluid passages or couplings are preferably applied at the (otherwise closed) ends of the expansion hoses 4. It is thereby also possible to couple several expansion hoses 4 (incl. slot formwork sideboards 5) in series with each other for making slots that are longer than the length of one expansion hose 4 with slot formwork sideboards 5.

[0010] Fig. 1 illustrates, in Figs. 1a-f, the method according to the invention for applying an elongated slot or break, in particular an expansion joint, called slot 1 hereinafter, in a concrete slab or structure, called concrete slab 3 hereinafter, to be poured in external formwork 2, comprising the steps of:

- applying external formwork 2 on a base or bottom plate 2a and providing a device according to the invention, comprising an expansion hose 4 with slot formwork sideboards 5 on both sides, and applying said device at the location of the intended slot (see Fig. 1a);
- expanding the expansion hose by introducing the

pressure fluid, so that the elongated slot formwork sideboards 5 move away from each other, until the distance d between the external surfaces of the slot formwork sideboards 5 turned away from each other substantially coincides with the intended width of the slot 1 to be applied (see Fig. 1b);
- pouring concrete in the external formwork 2 on the bottom plate 2a on either side of the device 4,5 according to the invention (see Fig. 1c);
- leaving the poured concrete to harden (see Fig. 1d);
- after hardening of the poured concrete, relieving by evacuating/vacuuming of the expansion hose 4 (see Fig. 1e) and then removing the device 4/5 according to the invention (see Fig. 1f).

[0011] Thus, the present invention provides a device and a method for applying a/an (expansion) slot 1 in a concrete slab or structure 3 that is to be poured, to save time and gain speed in the making of expansion joints etc., for example in concrete roads, cycle tracks, bridges, viaducts etc.

[0012] Regarding a patent specification EP1048788 cited as D1 in the Novelty Report (identical in content to Dutch patent specification NL1011943), it is noted that the present invention relates to a method and device for applying an elongated slot or break, in particular an expansion joint, in a concrete slab or structure that is to be poured in external formwork, wherein adjacent external formwork parts (the slot formwork sideboards 5) are held temporarily (namely prior to and during the pouring and hardening of the concrete) apart from each other by inflating, by means of a (gaseous or liquid) pressure medium, a hose between said adjacent external formwork parts. After hardening of the concrete, the pressure is removed from the hose and the hose and the formwork parts are removed, leaving behind the concrete slabs including the intermediate (open) expansion slots. These expansion slots may later be filled for example in a conventional manner with a more or less plastic material.

[0013] The patent specifications EP1048788 and NL1011943 cited in the Novelty Report relate - in contrast to the present invention - to a method for the (permanent) sealing (filling) of an expansion slot between two (already existing) concrete elements, wherein the sides of said elements are provided with a layer of adhesive and then a (non-inflated) rubber hose is placed in said expansion slot between the concrete elements. Then the hose is inflated, so that as a result of the applied layer of adhesive it adheres to the sides of the expansion slot and therefore fills the expansion slot. In EP1048788 and NL1011943, the hose is thus used to form a flexible expansion joint, which fills and seals the expansion slot permanently (being glued against the sides of the two concrete elements).

[0014] Thus, it must be concluded that in light of the cited patent specifications EP1048788 and NL1011943, the present invention is both novel and inventive.

Claims

1. Device intended and arranged as an aid for applying an elongated slot or break, in particular an expansion joint, called slot (1) hereinafter, in a concrete slab or structure, called concrete slab (3) hereinafter, to be poured in external formwork (2),

   said device comprising an elongated expansion hose (4) made of flexible material, closed at both ends, connected at the sides to elongated slot formwork sideboards (5), all this being arranged so that during use, the expansion hose and the slot formwork sideboards connected thereto extend substantially horizontally in their longitudinal direction, whereas the principal planes of both slot formwork sideboards extend substantially vertically;
   wherein the expansion hose is provided with at least one pressure fluid passage or coupling, intended and arranged for supplying and/or discharging a pressure fluid to or from the hose for the purpose of expanding the expansion hose by pumping the pressure fluid in, or relieving the expansion hose by pumping out or discharging the pressure fluid.

2. Device according to claim 1, wherein the pressure fluid is air.

3. Device according to claim 1, wherein the pressure fluid is a liquid.

4. Device according to one of the preceding claims, wherein the at least one pressure fluid passage or coupling is applied in or near at least one end of the expansion hose.

5. Method for applying an elongated slot or break, in particular an expansion joint, called slot (1) hereinafter, in a concrete slab or structure, called concrete slab hereinafter, to be poured in external formwork, comprising the steps of:

   - providing a base or bottom plate (2a) and external formwork (2);
   - providing a device (4/5) according to claim 1 and applying said device at the location of the intended slot;
   - expanding by introducing the pressure fluid into the expansion hose, so that the elongated slot formwork sideboards move away from each other, until the distance (d) between the external surfaces of the slot formwork sideboards turned away from each other substantially coincides with the intended width of the slot to be applied;
   - pouring concrete into the external formwork on either side of the device according to claim 1;

- leaving the poured concrete to harden;
- after hardening of the poured concrete, relieving the expansion hose and then removing the device according to claim 1.

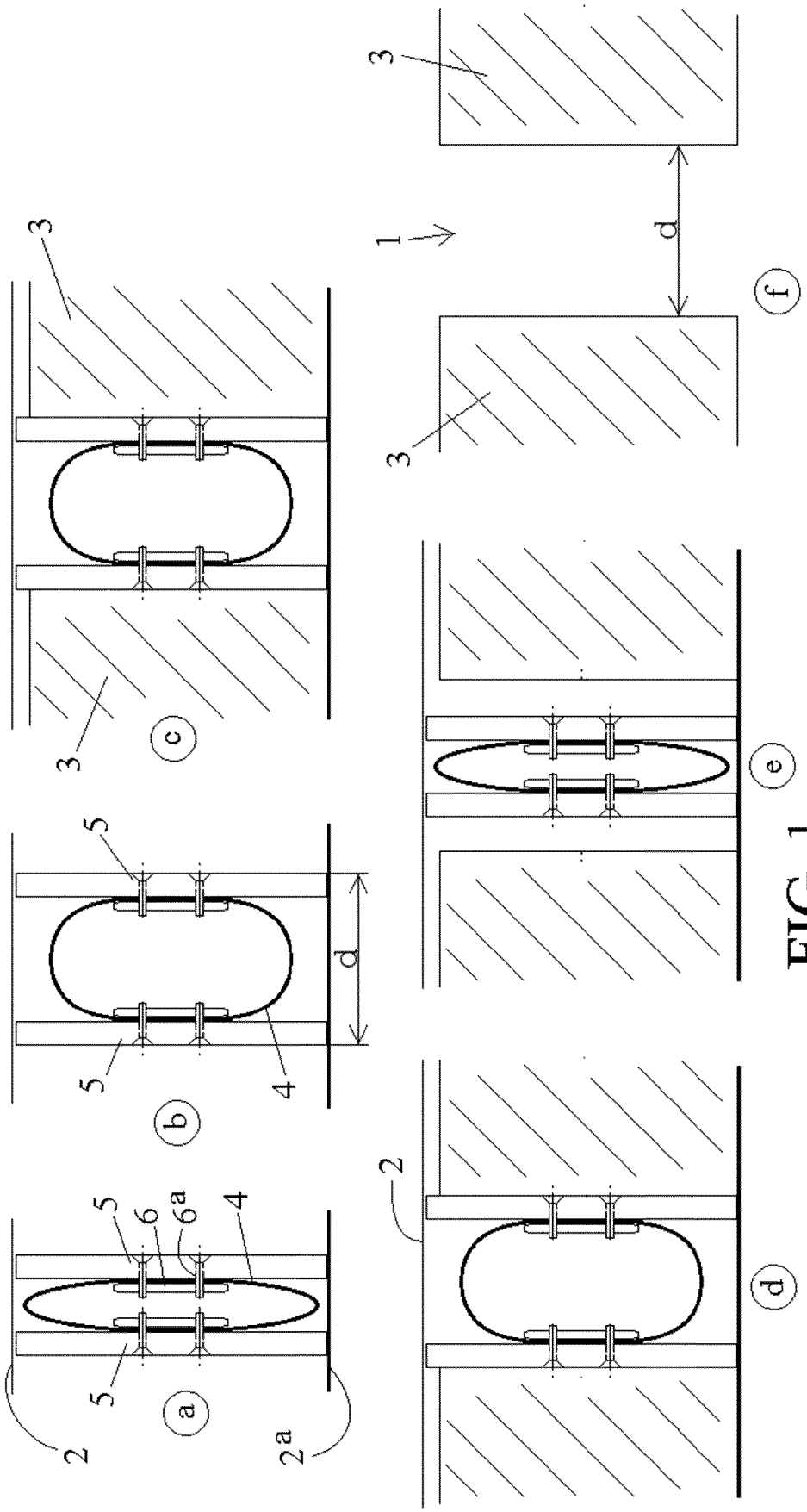

FIG. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 23 17 0703

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,D	EP 1 048 788 A1 (KESSEL BUREN B V GEB VAN [NL]) 2 November 2000 (2000-11-02) * the whole document *	1-4	INV. E01C23/02 E01D19/06
X	DE 32 19 136 A1 (MAURER FRIEDRICH SOEHNE [DE]) 24 November 1983 (1983-11-24) * the whole document *	1-5	
A	US 1 870 130 A (MAUTZ WILLIAM P ET AL) 2 August 1932 (1932-08-02) * the whole document *	1-5	

TECHNICAL FIELDS SEARCHED (IPC)
E01C E01D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	5 September 2023	Movadat, Robin

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 17 0703

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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05-09-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1048788 A1	02-11-2000	EP 1048788 A1	02-11-2000
		NL 1011943 C2	31-10-2000
DE 3219136 A1	24-11-1983	NONE	
US 1870130 A	02-08-1932	NONE	

EPO FORM P0459

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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Patent documents cited in the description

- EP 1048788 A **[0012] [0013] [0014]**
- NL 1011943 **[0012] [0013] [0014]**