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

(11) Publication number: **0 050 166**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **80200982.9**

(22) Date of filing: **16.10.80**

(51) Int. Cl.³: **E 02 B 3/06**, E 02 D 29/02

(43) Date of publication of application: **28.04.82**
Bulletin 82/17

(84) Designated Contracting States: **AT BE CH DE FR GB IT LI LU NL SE**

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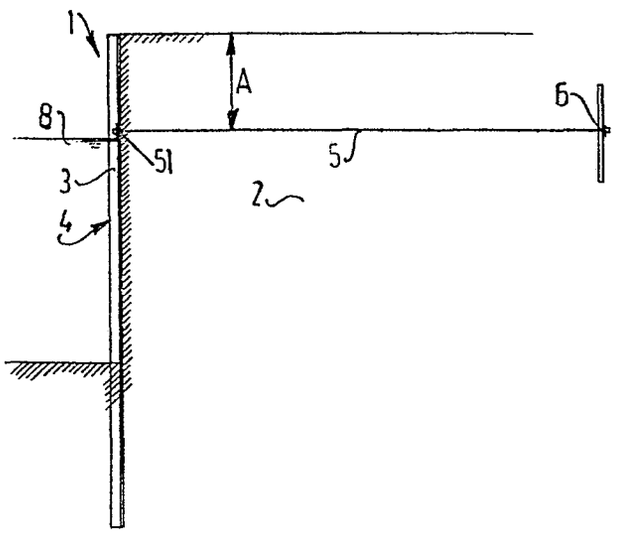
(54) Retaining wall.

(57) In order to reduce the bending load of a ground retaining screen (4), a wall (54, 63, 70) is arranged behind this screen (4), which wall (54, 63, 70) is connected to this screen by means of supporting (18, 60, 66, 73) whereas a ground-free space (14) is present between the screen (4) and the wall.



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Ground retaining wall.

The invention relates to a ground retaining wall comprising a screen standing in the bottom and a series of ground-anchored anchors engaging the screen at least at one level.

Such a ground retaining wall is known from Dutch Patent Application No. 6514655 laid up for public inspection. In this known ground retaining wall the screen is formed by a series of adjacent dam wall profiles. These dam wall profiles are of a heavy stucture, because the level of the ground anchors is frequently high, for example, because the ground anchors have to be arranged above a higth-tide level or else above an obstruction present in the ground. The screen may, as an alternative, consist of a concrete retaining wall, which has then to be resistant to high bending load.

The invention provides a ground retaining wall having a less heavy and hence cheaper screen. For this purpose the ground retaining wall according to the invention is characterized by at least one ground retaining wall standing

at a distance from the screen and bearing on the part of the screen located above said level with the aid of pressure-transmitting supporting means, whilst a ground-free space is provided between the standing wall and the screen.

Thus the bulging moment below the level of application of the ground anchors is reduced owing to the exertion of a horizontal effort on the part of the screen located above the level of engagement of the anchors.

When the space between the standing wall and the screen is substantially free of ground, the pressure of the ground bearing on the screen is reduced, which permits of using a still lighter screen.

When the supporting means are formed by concrete cover plates, they may, in addition, serve as a road pavement or a quay.

A simple construction is obtained when the supporting means together with the standing wall are formed by concrete angular profiles.

The invention will be described more fully with reference to some embodiments shown in the drawing.

The drawing shows schematically in:

Fig. 1 a cross-sectional view of a known ground retaining wall,

Fig. 2 the line of moments of this known ground retaining wall,

Figs. 3, 5, 7, 9, 11 and 13 each a sectional view of specific ground retaining walls in accordance with the invention,

Figs. 4, 6, 8, 10, 12 and 14 the lines of moments associated with Figs. 3, 5, 7, 9, 11 and 13 respectively,

Fig. 15 a perspective view of the ground retaining wall of Fig. 7.

Fig. 1 shows a ground retaining wall 1 comprising a screen 4 formed by a series of contiguous dam wall profiles 3 standing in the ground 2 and a plurality of ground anchors 6 fixed in the ground, which engage the screen 4 at the level A by means of anchor heads 51 and which are connected with the anchor heads 51 by means of anchor cables 5.

The ground 2 exerts a pressure on the screen 4

opposite the pressure of the water 8, whereas the screen is retained by ground anchors 6 having a tractive force P.

Fig. 2 illustrates the line of moments due to the forces exerted on the screen 4, the line of moments being designated at the area of the anchor heads 51 by M_a, he maximum potential moment being designated by M_{max}. The weight of the dam wall profiles 3 is a function of M_{max}.

The ground retaining wall according to the invention is distinguished from the known ground retaining wall described above as follows.

In the ground retaining wall 53 shown in Fig. 3 according to the invention a wall 54 is standing at a distance b from the screen 4, said wall bearing on the part of the screen 4 located above the level A with the aid of pressure-transmitting supporting means 60. The space 14 between the standing wall 54 and the screen 4 is substantially free of ground and only contains air. The supporting means 60 may consist of a plurality of pressure bars of a framework, but preferably they are formed by reinforced concrete cover plates 10 having longitudinal ribs 57 engaging the top edges 58 and 59 of the dam wall profiles 3 and of the wall 54 respectively. The wall 54 is standing on a concrete foundation 13 and retains the top layer 55 of the ground 2. The pressure g exerted by the top layer 55 on the wall 54 is balanced out by the pressure force K of the supporting means 60 and the tensile force S of the anchor cables 9, which connect anchor heads 61 with the ground anchors 6. Owing to the application of the force K the line of moments of Fig. 4 is obtained, where M_{max} is considerably lower than that of Fig. 3. Moreover, owing to the ground-free space 14 the overall pressure of the ground 2 to be retained is appreciably reduced. As a result the dam wall profiles 3 of the screen 4 in Fig. 3 may be of considerably lighter weight than those of Fig. 1.

The ground retaining wall 15 of Fig. 5 is distinguished from that of Fig. 3 in that the standing wall 63, the cover plates 64 as well as the foundation slabs 65 of the wall 63 form part of reinforced concrete longitudinal profiles 66, which are deposited on the dam wall profiles 3 and

engage by a rib 67 the top edges 58. The cover slabs 64 are located in this example at a lower level than the top surface 68 of the ground 2, so that the dam wall profiles are shorter.

The ground retaining wall 17 of Fig. 7 is distinguished from the ground retaining wall 15 in that the longitudinal profiles 18 are substantially L-shaped and the foundation of the standing wall 70 is formed by piles 20.

The ground retaining wall 19 of Fig. 19 is distinguished from that of Fig. 7 in that the ground-free space 14 is enlarged by leaving out ground in a space 71 below the water level 72, as a result of which the ground pressure to be retained is further reduced.

The same effect - but to an even higher extent - is obtained with the ground retaining wall 22 of Fig. 11, in which the distance b of the standing wall 70 from the screen 4 is chosen to be additionally large, whilst the long cover slabs 73 are supported inter alia by piles 74.

The ground retaining wall 30 of Fig. 13, which is not the most preferable embodiment of the ground retaining wall according to the invention, has a small ground-free space 31 for the standing wall 32 consisting of short, lightweight dam wall profiles driven into the ground 2. Again the pressure q of the retained top layer 34 is absorbed by the screen 4 through supporting means 35.

In all embodiments shown the anchor means 51, 5 and 6 are arranged above the level of the water 8, which is usually required for these anchor means.

Instead of consisting of steel dam wall profiles the screen 4 may, as an alternative, consist of a reinforced concrete wall or concrete wall elements.

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C L A I M S

1. A ground retaining wall comprising a screen standing in the bottom and a series of ground-anchored anchors engaging the screen at least at one level, characterized by at least one ground retaining wall standing at a distance from the screen and bearing on the part of the screen located above said level with the aid of pressure-transmitting supporting means, whilst a ground-free space is left between the standing wall and the screen.

2. A ground retaining wall as claimed in claim 1, characterized in that the space between the standing wall and the screen is substantially free of ground.

3. A ground retaining wall as claimed in claim 1 or 2, characterized in that the supporting means are formed by concrete cover slabs.

4. A ground retaining wall as claimed in claim 1, 2 or 3, characterized in that the supporting means together with the standing wall are formed by a concrete angular profile.

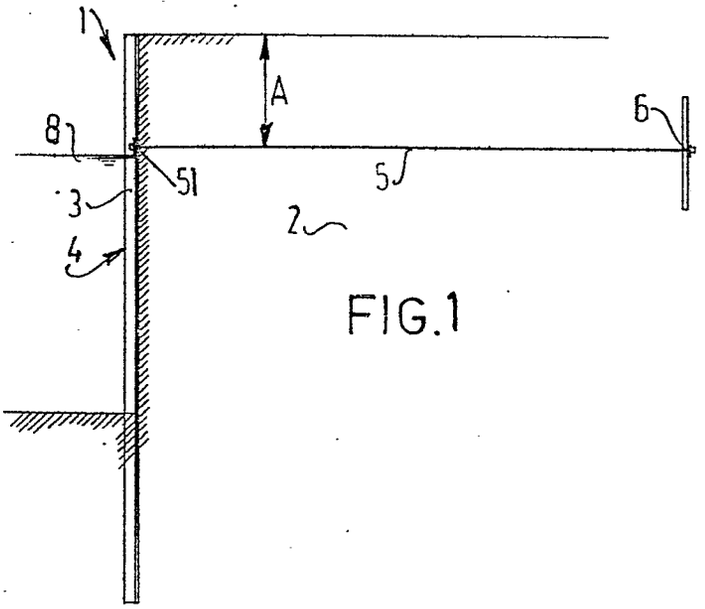

FIG.1

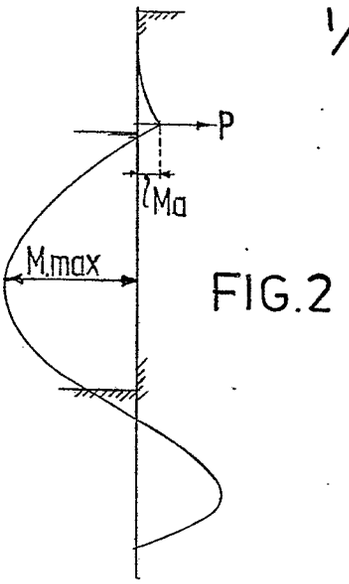

FIG.2

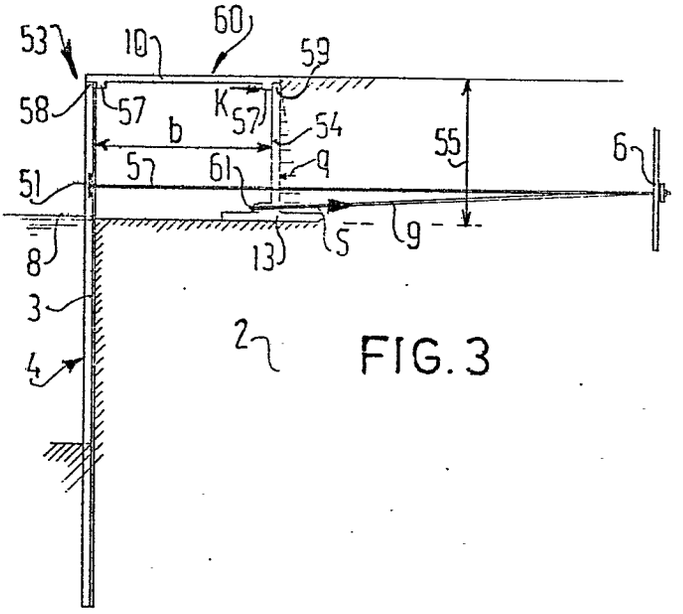

FIG.3

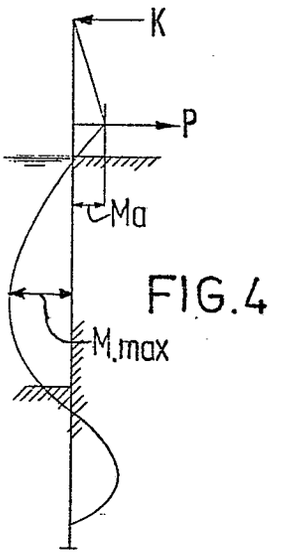

FIG.4

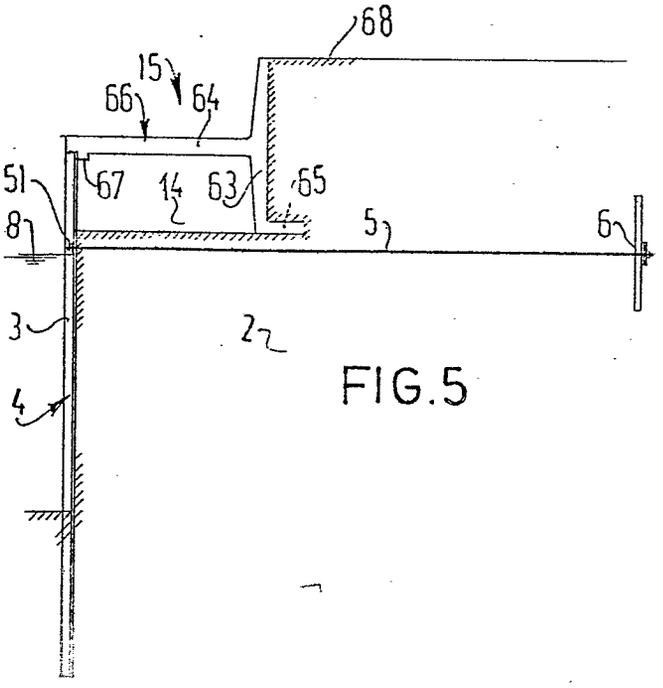

FIG.5

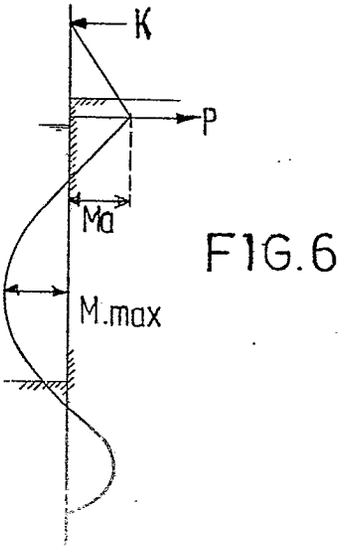

FIG.6

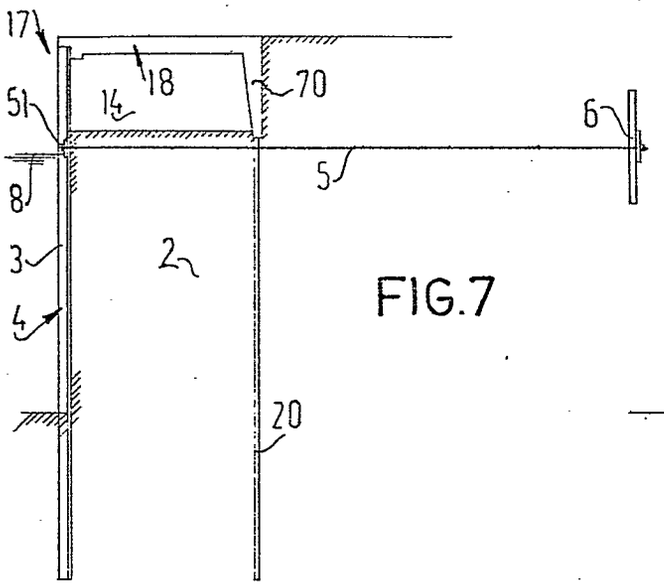

FIG.7

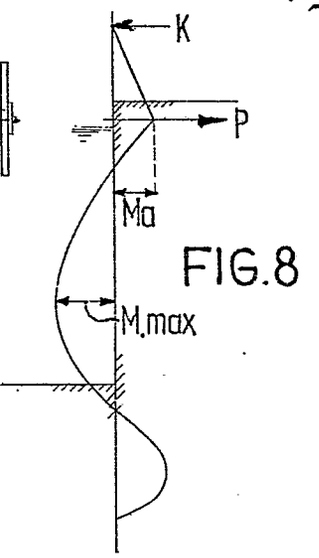

FIG.8

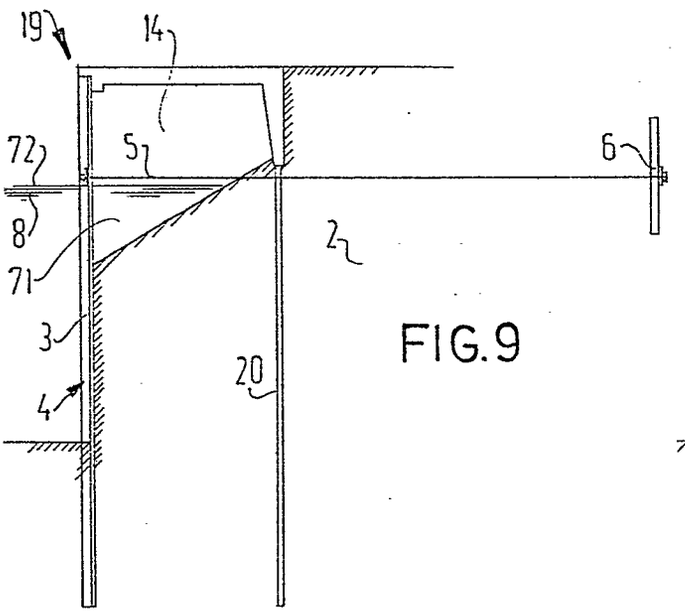

FIG.9

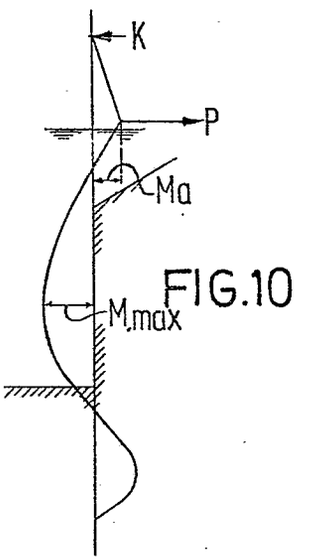

FIG.10

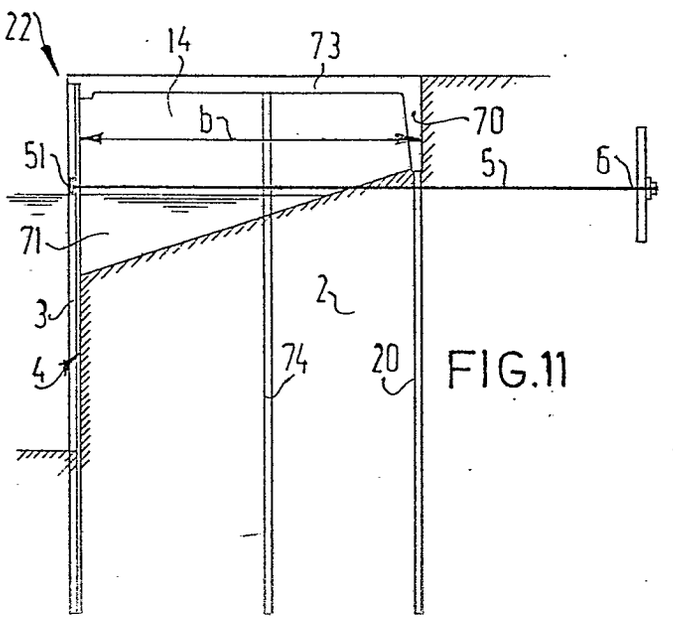

FIG.11

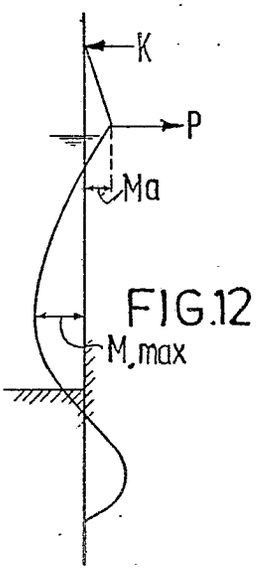

FIG.12

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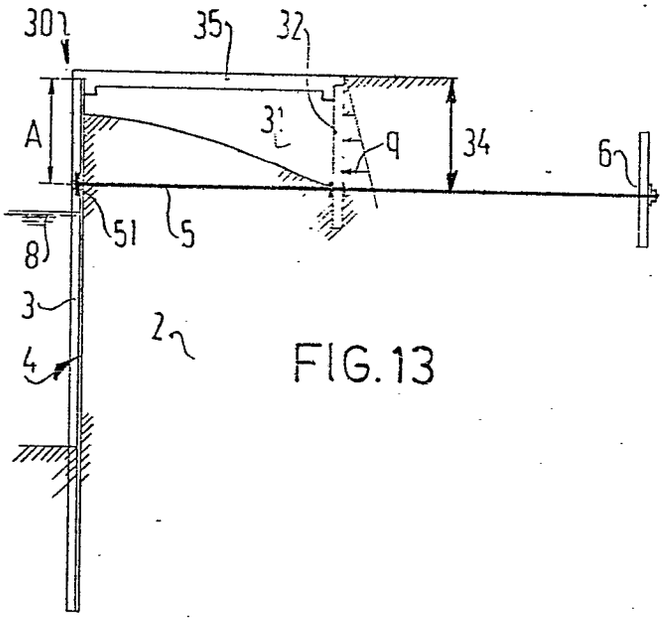

FIG.13

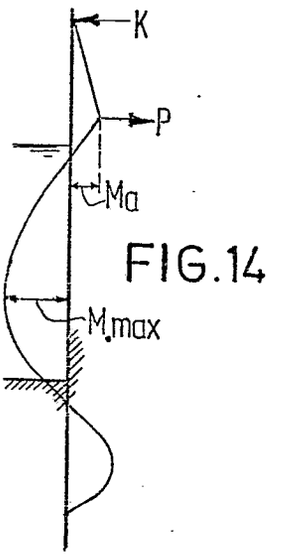

FIG.14

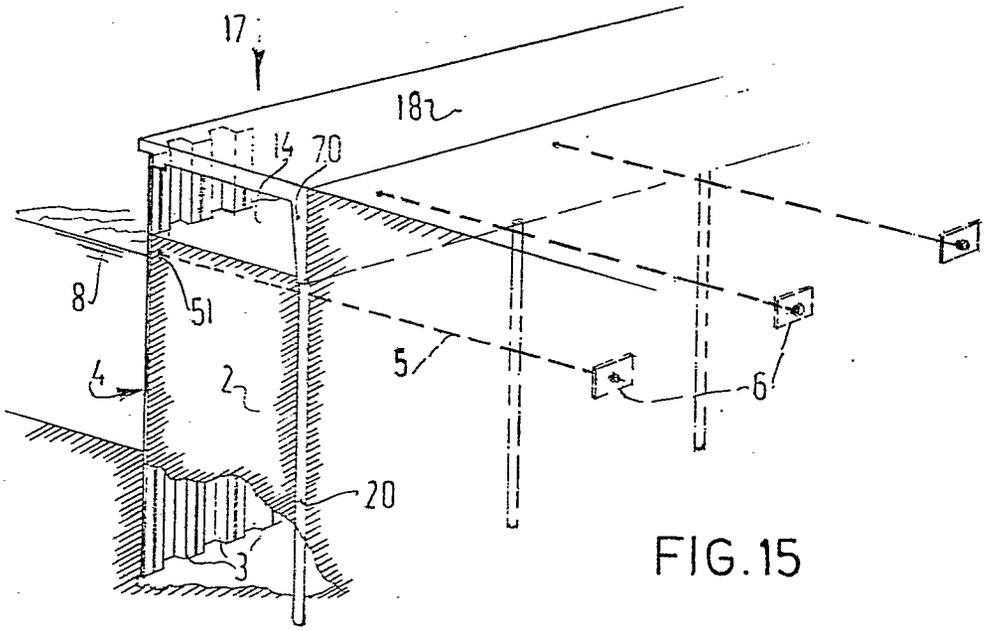

FIG.15

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EUROPEAN SEARCH REPORT

Application number
0050166
EP 80 20 0982

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	DE - B - 1 209 067 (DORTMUND-HÖRDER) * Column 2, lines 32-52; column 3, lines 6-13, 34-43; figures 3,4 *	1-4	E 02 B 3/06 E 02 D 29/02
X	TRAVAUX, no. 512, October 1977, Paris, FR A. HOUY: "Les palplanches en acier dans les ouvrages maritimes" pages 38-48. * Pages 43, column 3, figure 22 *	1-3	
X	FR - A - 737 124 (RAVIER) * Page 2, lines 96-104; page 3, lines 1-3,8-30,42-45; figures 7,10 *	1-4	TECHNICAL FIELDS SEARCHED (Int. Cl.³) E 02 B E 02 D
	BE - A - 380 552 (RAVIER) * Page 1, paragraph 3; page 2, lines 16-31; figures 1,8,9 *	1,2	
A	BE - A - 414 100 (FRANKIGHOUL)		CATEGORY OF CITED DOCUMENTS
A	DE - C - 561 822 (SCHROETER)		X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
A	FR - A - 339 355 (DELLEUR)		
			&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	09-06-1981	RUYMBEKE

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