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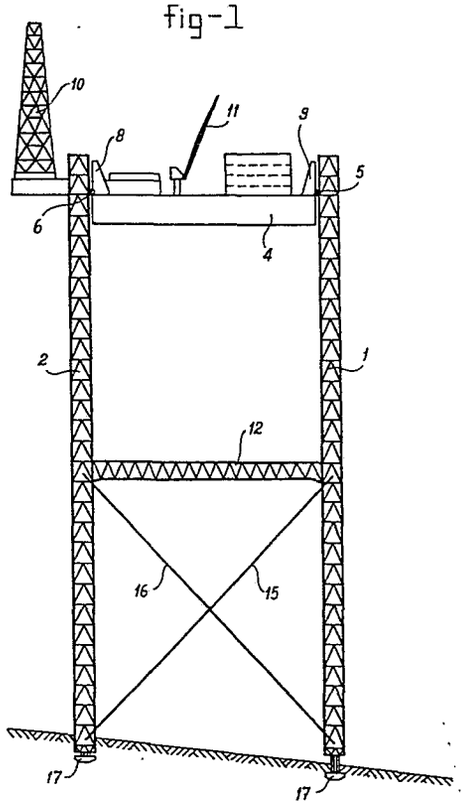
(54) **Artificial island.**

(57) Artificial island comprising a platform (4) such as ponton, and at least three legs (1, 2) for putting down the island onto the sea bottom and for supporting the platform. The slidable legs are located outside the perimeter of the platform supporting said platform through pivot joint supports (5). At least those sections of said legs, standing onto the sea bottom or to be placed thereon, are connected to each other (15, 16) in planes passing outside the perimeter of said platform to get a rigid structure.

fig-1



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Artificial island.

The invention relates to an artificial island comprising a platform, such as a pontoon, and at least three legs for putting down the island onto the sea bottom and for supporting the platform, and furthermore means for mutually displacing and locking the legs and the platform. Various embodiments of such artificial islands are known. In general they consist of a platform embodied as a pontoon and a number of legs which can be displaced and lockede into tubular guiding elements of the pontoon by means of a jacking and latching mechanism. because of the buoyancy of the pontoon it is possible to transport the island to the place of destination where the legs are lowered using the jacking mechanism, whereafter the pontoon by further using the jacking mechanism is moved upwards along said legs upto a level out of reach of the waves.

Such an artificial island is in the operating position, that means in he position in which the pontoon is elevated above the water level, exposed to external horizontal loads caused by the forces of waves, wind etc, resulting into bending moments in the legs and in the pontoon construction. Therefore the pontoon and legs are coupled to each other such that these bending moments can be transferred and absorbed. Said bending moments are maximum at the points where the pontoon and the legs are coupled to each other. To make it possible that the pontoon and the legs can be mutually coupled in each relative position such that the load can be absorbed, the legs have a horizontal cross-section which is uniform over the whole length of the legs. Thereby it is possible that in each relative position of the leg and the pontoon said legs can be locked correctly into the guiding elements of the pontoon.

As the island is designed for heavier environmental conditions and/or increased water depths, heavier constructions of the legs and the pontoon are necessary.

An object of the invention is now to provide an artificial island having a light contruction, which island is better suited for great water depths and/or heavier weather conditions and yet is simple of construction.

Said object is according to the invention reached in that the legs are located outside the perimeter of the platform, the supporting joint between the platform and each of said legs has the function of a pivot joint, and at least those aections of said legs, standing onto the sea bottom or to be placed thereon, are connected to each other in planes passing outside the perimeter of said platform to get a rigid structure. Because the legs are connected to each other into a rigid configuration and the platform is supported by said legs through pivot point supports the horziontal loads do not result into bending moments which are maximum at the beginning of the section rigidized by the coupling. In islands, which are for their dimensions etc comparable, these maximal moments amount furthermore only a part, for instance half of the maximal moments which are generated into the known constructions.

Because none of the connecting means between the legs is positioned into vertical planes crossing the platform it is possible to displace the platform respectively the pontoon in relation to said legs over the total heights of said legs and said legs can be raised until a height suitable for horizontal transport just as with known artificial islands. The connection preferably consists of horizontally extending connecting beams positioned into the same plane and at a height between the ends of said legs and rigidly connected to said legs, and furthermore by a cross-configuration of tie beams or cables underneath said connecting beams. By the combination of rigidly connected horizontal beams and the cross-configuration of tie beams or cables a light construction can be realized. Preferably the horizontal beams are thereby located at the half height of said legs.

According to the invention it is also possible to connect the legs over their whole length to each other and when the horizontal beams are used as above described then said connections can be realized by cross-configurations and/or one or more horizontal cables. If these connections are hindering the accessibility, for instance the supply of material, then the connections positioned above the horizontal beams can be embodied removable. Such removable cable connections can also be useful to couple the upper ends of said legs together when said legs are in the raised position.

The invention makes it possible to alter the horizontal cross-

section of each leg in the height- or longitudinal direction of said leg. Said cross-section can be adapted to the acting momental load such that the cross-section narrows from the horizontal beams to the ends of the legs. It is also possible to enlarge the cross-section of the part underneath said beams to get an increaed standing surface and therewith an increased stability. These possibilities to vary the cross-sectional shape, which are only mentioned as examples, are offered because of the pivot joint support of the platform and because the platform is able to move freely in vertical direction through the supporting construction formed by the legs and the connecting means without obstructing said freedom of movement by parts of the supporting construction.

Because the legs are coupled to each other into a rigid configuration it is not possible as by the known islands to adapt said legs independent of each other in vertical direction and also adaptions to bottom irregularities are not simply possible anymore. One of the measures to avoid inclination respectively to make adaptions possible is according to the invention to provide the legs with extendible and retractable jacks or auxiliary legs. These means are individually known from the prior art, just as the possibility to provide the under side of the legs with displacing means, such as catterpillar units.

It is remarked that in "Ocean Industry", September 1973, p. 115, an artificial island is described comprising a supporting frame with in vertical direction in relation thereto displaceable supporting legs and rigidly thereto connected upwards directed columns for moving the pontoon there a long and arrresting said pontoon. In this known construction the moments resulting from horizontal loads are transferred through the columns and the legs with the thereto coupled supporting frame and have a value which is approximately half the value generated in islands having throughgoing columns whereby the coupling between the legs and the pontoon is realized by means of leg guiding elements onto said pontoon. The necessity to use guiding elements for said legs which are able to receive said moments however still consists and the supporting frame carrying said columns therefore is still a heavy construction.

Furthermore known is the "Transworld Rig 60" built by Mitsui

Shipbuilding & Engineering Co.,Ltd. comprising four vertical buoyancy bodies which are coupled to each other by means of a framework of tubes from which four tubular columns are reaching upwards along which the platform can be moved upwards respectively downwards. Also in this rig the bending moments in the columns are reduced, but the platform can only move downwards until the upper level of the framework coupled to the buoyancy bodies, so that one has a top heavy construction during transport.

The invention will now be explained in more detail with reference to the drawings.

Fig. 1 illustrates a side view of an embodiment of an artificial island according to the invention.

Fig. 2 illustrates an other view of the island shown in Fig. 1.

Fig. 3 illustrates schematically another embodiment and

Fig. 4 illustrates a further embodiment.

The island illustrated in Fig. 1 comprises three legs 1, 2 and 3 contained into a framework. Between said legs the platform 4, embodied as a pontoon, is supported by not in detail illustrated couplings 5, 6, 7 respectively, embodied as pivot joint supports for supporting the legs 1, 2 and 3 and in the upstanding sections 8 and 9 thereof a jacking and latching mechanism, which is also not illustrated in detail is housed. Said mechanism can be realized by jacking and latching cylinders cooperating with latching beams and working with gear racks or toothed sections or other known means.

Onto this platform several devices can be installed such as a drilling derrick 10, a crane 11 etc.

According to the invention the legs 1 until 3 are coupled into a stiff configuration by means of the horizontal beams 12, 13 and 14 which are, as is the best illustrated in Fig. 2, extending such that they are positioned outside the vertical bounding surface of the perimeterence of the pontoon 4 and further consisting of cross-configurated tie beams or cables 15 and 16.

The legs 1 until 3 have extendible leg portions 17 at their under end to make adaptions for instance to a inclined sea bottom possible.

The embodiment of Fig. 3 differs from that illustrated in Fig. 1 in fact only in that the legs have a cross-sectional shape with a

maximum dimension at the height of the horizontal beams 12 and a cross-sectional dimension which is narrowing in the upwards and downwards leg direction as adaption of the necessary material to the generated maximal momental load.

In the embodiment of Fig. 4 the legs 1 and 2, which are rigidly coupled by the beams 12 and the cross-configurations 15, 16, are enlarged by the sidewards extending broadenings 18 and 19 such that an increassed carrying surface is realized.

Fig. 4 also indicates that it is possible to install one or more cross-configurations 20, 21 and/or horizontal tie cables 22 in the section above the horizontal beam 12.

C L A I M S.

1. Artificial island comprising a platform such as a pontoon, and at least three legs for putting down the island onto the sea bottom and for supporting the platform, and furthermore means for mutually displacing and locking the legs and the platform, characterized in that, the legs are located outside the perimeter of the platform, the supporting joint between the platform and each of said legs has the function of a pivot joint, and, at least those sections of said legs, standing onto the sea bottom or to be placed thereon, are connected to each other in planes passing outside the perimeter of said platform to get a rigid structure.

2. Artificial island according to claim 1, characterized in that the connection is realized by horizontally extending connecting beams positioned into the same plane at a height between the ends of said legs and rigidly connected to said legs, and furthermore by a cross-configuration of tie beams or cables underneath said connecting beams.

3. Artificial island according to claim 1 or 2 characterized in that the legs are connected to each other over their whole length.

4. Artificial island according to claims 2 and 3, characterized in that the connection between said legs above said connecting beams is realized by disconnectable cables.

5. Artificial island according to claim 2, 3 or 4, characterized in that the horizontal beams are located at the half height of said legs.

6. Artificial island according to one or more of the preceding claims, characterized in that the horizontal cross-sectional shape of each of said legs changes in the height- or longitudinal direction.

7. Artificial island according to claim 6, characterized in that the cross-section has a maximum at the location of said horizontal connecting beams and narrows to the ends of said legs.

8. Artificial island according to claim 6, characterized in that the cross-section enlargess in downwards direction in the section underneath said horizontal conneting beams.

9. Artificial island according to one or more of the preceding claims, characterized in that the legs are comprising extendible and retractable jacks or auxiliary legs.

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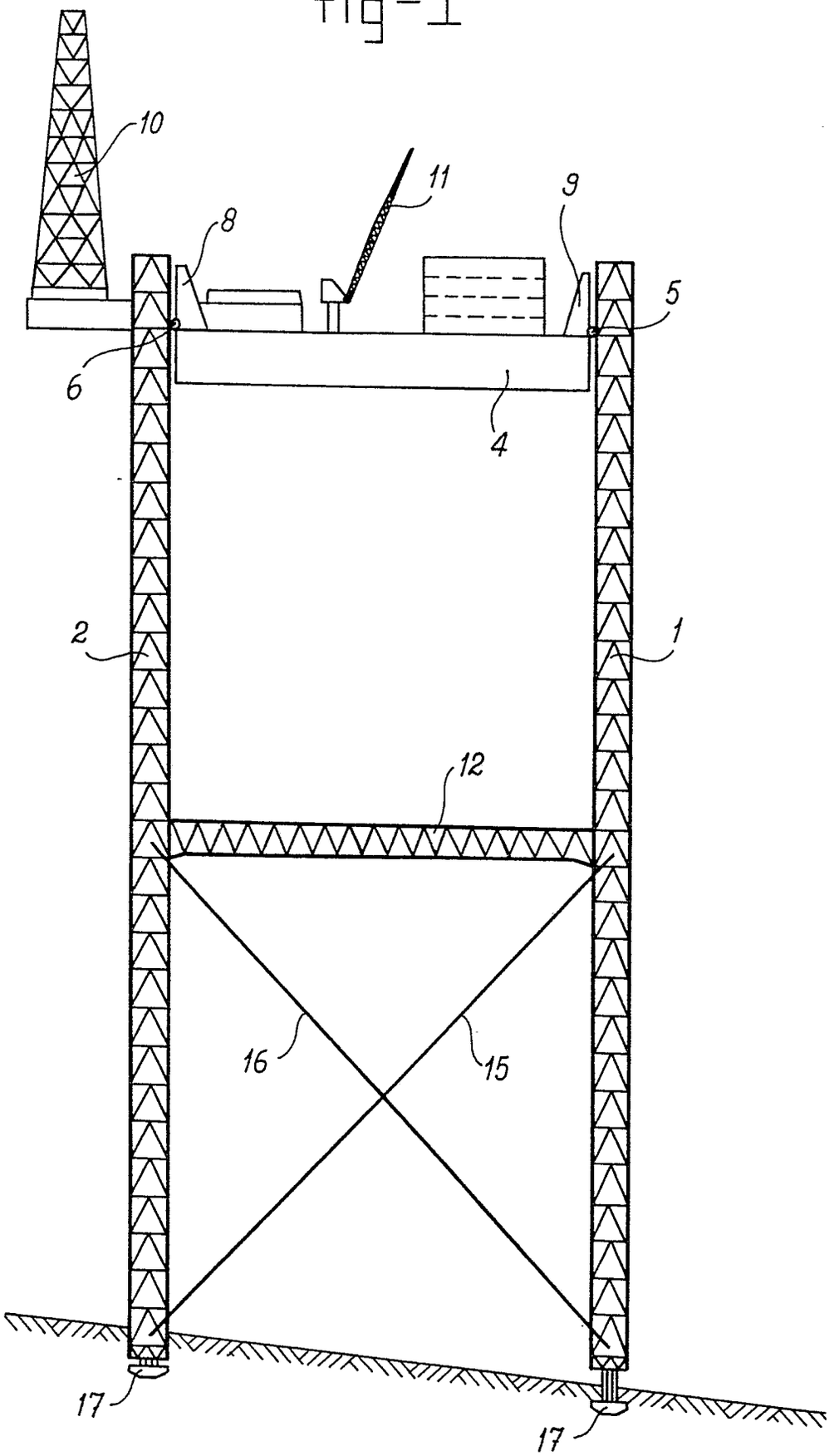
fig-1



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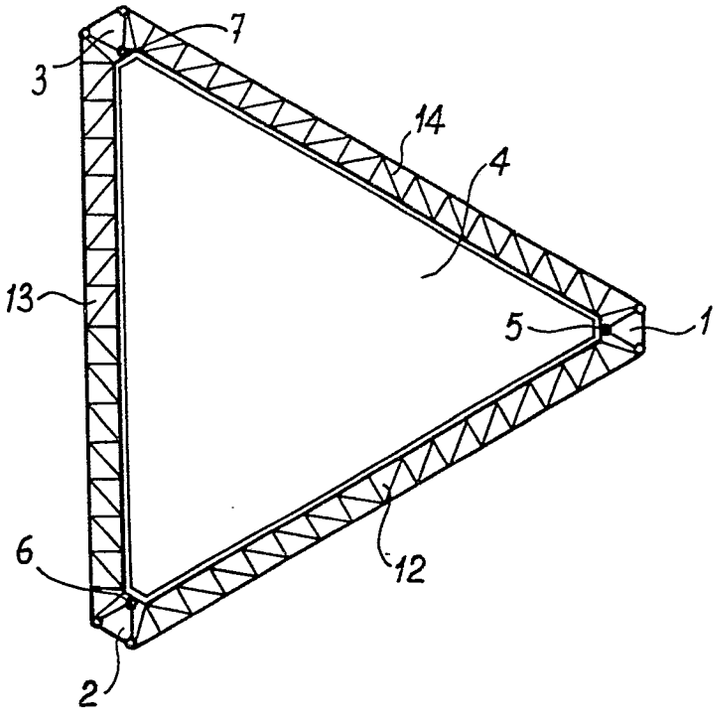


fig-2

fig-3

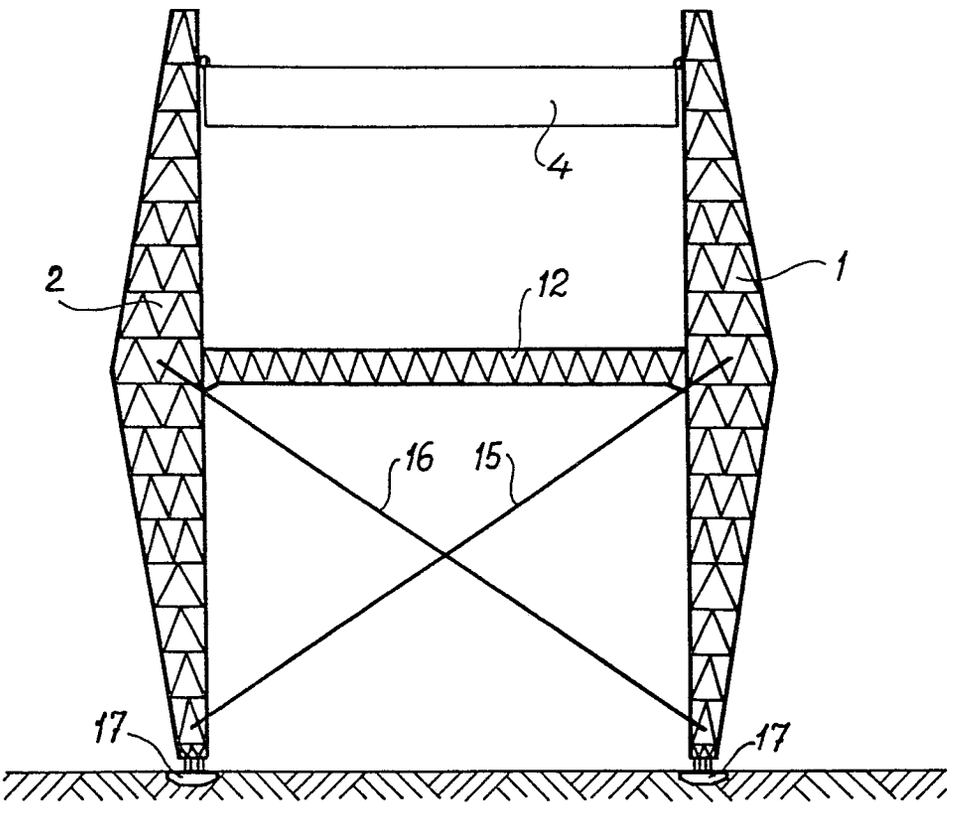
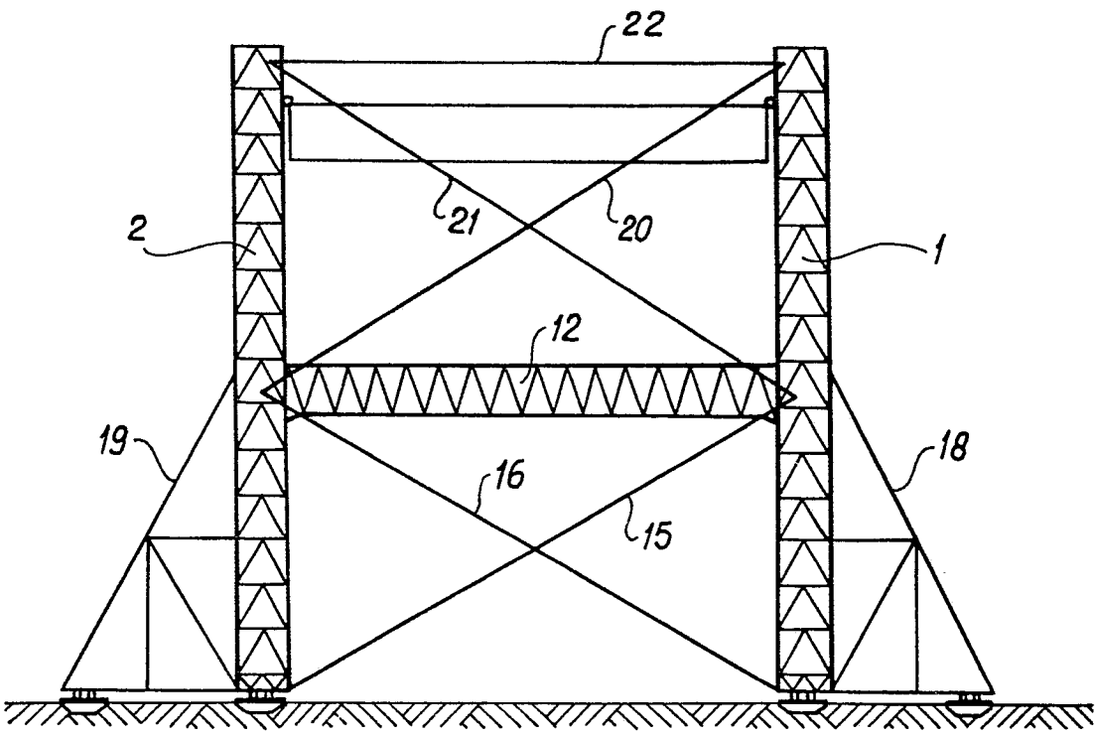


fig-4



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EUROPEAN SEARCH REPORT

Application number
EP 81 20 1329

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
X	US - A - 3 402 557 (STEELE) * Column 2, lines 32-72; column 3, lines 1-75; column 4, lines 1-14; figures 1-4,12 *	1,2,3,5
A	NL - A - 72 01658 (REDPATH DORMAN) * Page 1, lines 7-13; page 2, lines 1-22; pages 5,6,7; figure 6 * & US - A - 3 897 639	1,2
A	US - A - 3 727 414 (DAVIES) * Column 1, lines 46-68, column 2, lines 1-63; figures 1,11 *	1
A	US - A - 3 367 119 (RYBICKI) * Column 5, lines 20-25; figures 4,5 *	1
A	GB - A - 1 220 689 (JANSZ) * Page 3, lines 73-81; figure 7 * & NL - A - 68 17633	3,4,5
A	US - A - 2 210 408 (HENRY) * Page 2, column 1, lines 47-75; page 2, column 2, lines 1-7; figure 6 *	9

CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)

E 02 B 17/02

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

E 02 B

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

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	12-03-1982	HANNAART