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54 **ARTIFICIAL ISLAND OR WORK PLATFORM.**

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## Description

The invention relates to an artificial island or work platform comprising a pontoon or work floor and at least three columns displaceable in vertical direction in relation to the pontoon or work floor and attachable thereto, wherein at least one of said columns has in essence a multiangular horizontal cross section and comprises a tothing on at least one vertical longitudinal corner member, cooperating with locking beams of a clutching and clamping mechanism mounted onto the pontoon or work floor, which locking beams are moveable into and out of the openings between the teeth of said tothing, and comprising furthermore an elevating mechanism acting in vertical direction in conjunction with the clutching and clamping mechanism.

A construction of this type is described in the Dutch Patent Application 6600285, which is laid to public inspection.

In this prior art construction the columns comprise outwards extending gear racks positioned in alignment with two opposed side walls and said gear racks are cooperating two by two with locking beams extending over more than the whole width of the other side walls and therefore having a length which is larger than the distance between two gear racks extending into the same direction. Said locking beams have to withstand large bending moments. These bending moments are increasing as the dimensions of said columns in the horizontal plane are increasing. This enlarges of course the weight of said locking beams and the dimensions of the tooth-openings in the gear racks. Said tooth-openings are formed an additional resistive factor for waves, wind and currents, increasing as said tooth-openings are larger and therefore extending further outside the profile of the column.

The columns are extending through rectangular openings in the pontoon or work platform and the side walls of said openings have guiding means for said columns. The guiding means are cooperating with the side walls of the columns such that when the gear rack dimensions are increasing said guiding means should bridge a greater distance to correctly guide said columns.

The purpose of the invention is now to provide an artificial island or work platform having a simple, strong and properly guideable construction as a whole also with larger column dimensions.

Said object is according to the invention obtained by the characterising features of claim 1.

The tooth-openings are therefore not embodied as recesses into strips extending outside the column profile, but by openings into the column angle profiles, which principle has wide spreading consequences for the complete construction. The openings into the pontoon or platform can have side walls which are very close to the side walls of the columns so that the dimensions of the guiding elements can be

reduced significantly and the loads between the pontoon and the column can be transferred in a more favourable way.

Still long beams can be used as locking beams meshing with extending parts into said openings, however said beams can be guided in such a way that the connecting section between both ends of said beam is not or not in a significant way loaded by bending moments.

Preferably however short locking beams are used which are displaceable into and out of the openings in the direction of the bisector of the inner angle of the profile and special preference is given to locking beams which are displaceable into or out of the tothing rotating around a vertical axis.

Because the locking beams, meshing into a tothing opening of a longitudinal profile are supported very close to the edges of said opening into the frame work surrounding the column, the bending load onto said locking beams is very small so that said locking beams can have a significantly smaller thickness and also the height of the tooth opening can be respectively small.

Preferably the angle profiles comprising the series of openings or recesses forming the tothing, are beyond said openings on their inner surfaces mutually connected by means of a plate positioned transverse to the bisector of the inner angle of said profile. Said plate is strengthening the profile near the recesses and is closing and sealing off the column in the case where it is desirable to use a closed tubular profile for said column.

The principle according to the invention can be applicated to columns of the closed type and columns of the open type. Columns of the closed types have completely closed side walls made out of plates. According to the invention the wall thickness of the plates between the angle profiles can be thinner than the thickness of the angle profiles.

In the open column construction girders are running between the legs of the angle profiles.

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

Figure 1 illustrates in side view a small part of a pontoon with a part of one column and corresponding mechanisms.

Figure 2 illustrates a cross section according to the line II—II in Figure 1.

Figure 3 is a horizontal cross section at larger scale near the corner of a column in a somewhat different construction.

Figure 4 illustrates at a still larger scale a horizontal cross section of a possible embodiment of a column guiding system.

Figure 5 illustrates schematically a possible different embodiment of the locking beams and Figure 6 illustrates a third possible embodiment of the locking beams.

Figure 1 illustrates the deck 1 of a pontoon 2.

Furthermore a column 3 is illustrated surrounded by a clutching and holding mechanism.

The clutching and holding mechanism comprises a frame 4 with beams 5 which are rotatable round a vertical pinion 6 and they are each combined with an operating cylinder 7. The beams are positioned at each corner of the column 3 and are meshing into recesses 8, made into the longitudinal corner members 9 of each column. Therefore each of the four longitudinal members has a series of recesses 8.

The frame 4 is installed at a fixed position onto the deck of the pontoon.

Above this frame a second frame 14 is installed comprising beams 15 rotatable around vertical pivot shafts 16 and operated by cylinders 17. These beams are illustrated in the resting position in Figure 2 whereas the working position is indicated by means of dash and dot lines.

The frames 4 and 14 have in a way which is comparable to the columns a series of recesses or openings 18 in the corners of the frames and the edges of said openings 18 are used as supporting surfaces for the activated beams.

The frames 4 and 14 are interconnected by means of a number of cylinders 20 so that in a generally known way the relative mutual displacement between columns and pontoon or platform can be realised.

The Figures 1 and 2 show clearly that the distance between the inner frame wall 21 and the outer column wall 22 is very small because no significant distance is necessary for outwards extending gear racks.

The angle profiles forming the longitudinal corner members 9 have at the inner side connecting plates 23, positioned perpendicular to the bisector of the inside angle of the profile. In a closed column construction, as is illustrated in the figures 1 and 2, said plates are also functioning for closing and sealing the column.

The embodiment of Figure 3 differs from the embodiment of Figures 1 and 2 in the location of the cylinder 24, and especially the point of attachment 25 to the lock beam 26 which, as in the previous example, is rotatable around a vertical pivot shaft 27. Figure 3 illustrates the lock beam, installed at each corner, in the activated position and with dash and dot lines in the resting position. In the activated position the lock beam is, dependent on the working situation, in contact with the upper or lower surface of the recess indicated with 28 and 29, as well as with the lower and upper surface 30 and 31 of the corresponding recess in the frame 4 or 14.

A guiding construction embodied as a number of ribs 32 is indicated in Figure 2.

Figure 4 illustrates a corner detail in the throughgoing opening of the pontoon showing a longitudinal profile 9 of a column inside the corner 33 comprising the guiding strips 34 and 35 which are mutually connected by means of supporting strips 36 and are welded to the inner walls 37 and 38 of the opening in the pontoon. In this way a low tolerance guiding is possible.

Figure 5 illustrates schematically a column 40 in a frame 41 which frame can support the clutching

and locking means or the elevating mechanism. In this embodiment the locking mechanism comprises a long beam 42 extending along the side wall of the column and comprising at the ends the locking blocks 43, 44 extending into the openings 45 and 46 of the profiles 47, which profiles are forming the longitudinal corner members. Said locking beams 42, 43, 44, which are installed at both sides of the column in each frame, can be guided into openings of the profile or plate sections of the frame so that the connecting beam 42 inbetween the locking blocks 43 and 44 is not influenced by a bending load.

The operation can be realised either by means of two cylinders, one for each block 43 respectively 44, or by means of one cylinder, coupled to the center part of the connecting beam 42.

In the left part of Figure 5 the active situation is indicated and in the right part the resting situation is indicated, however it will be possible that in each frame both locking beams might be simultaneously in the active position or simultaneously in the resting position.

Figure 6 illustrates schematically a further embodiment in the form of a locking girder 48 installed at each corner, which locking girder 48 is displaceable from the non resting position indicated by the dash and dot lines to the active position indicated by full lines and is thereby moving in the direction of the bisector 49. Said displacement can be realised by means of one single cylinder acting into the direction of the bisector onto the center of the girder 48, whereby the correct position is reached when the girder comes into contact with the edges 50, 51 of the opening 52.

The embodiments illustrated in the Figures 5 and 6 are only functioning as illustration of the large variety of possibilities which is created by replacing the gear racks by openings into the longitudinal angle profiles.

The rotatable beams as indicated in the Figures 1, 2 and 3 are however preferred.

It will be clear that thanks to the invention a column construction is obtained having a significantly lower resistance to waves, wind and currents. Therefore the column can be considered as a smooth column. It is furthermore possible to embody the column symmetrically. Because the frame opening more tightly encloses said column the loads in the column as well as in the pontoon are reduced. Furthermore the construction will be simpler and therewith lighter. That has in turn influence onto the power to be installed for operating the columns.

### Claims

1. Artificial island or work platform comprising a pontoon (2) or work floor and at least three columns (3), displaceable in vertical direction with respect to the pontoon or the work floor and attachable thereto, of which at least one column has in essence a multi-angular horizontal cross section and comprises a toothing on at least one

vertical longitudinal corner member (9), co-operating with locking beams (5) of a clutching and clamping mechanism movable into and out of the openings between the teeth of said toothing, which clutching and clamping mechanism is connected to the pontoon or work platform, and an elevating mechanism (20) functioning in vertical direction in conjunction with the clutching and clamping mechanism, characterized in that the corners of the or each multiangular column (3) are formed by longitudinally extending angle profiles (9) and the toothing is embodied as a series of recesses (8) made at regular mutual distances into the angle profile which recesses each extend inwardly over a predetermined distance from the corner, whereby the toothing does not project outwardly from the respective corner of the column.

2. Artificial island or work platform according to claim 1, characterized in that the angle profiles which have the series of recesses (8) forming the toothing, have the inner surfaces of the limbs of the profile beyond the recesses mutually connected by means of a plate (23) positioned transverse to the bisector of the angle of said profile.

3. Artificial island or work platform according to claim 1 or 2, wherein the column or columns, which are multi-angular in cross section, have closed side walls, and the wall thickness of the angle profiles is thicker than the wall plates in between said angle profiles.

4. Artificial island or work platform according to one or more of the preceding claims, characterized in that the locking beams are rotatable into or out of said toothing around a vertical axis.

#### Patentansprüche

1. Künstliche Insel oder Arbeitsplattform mit einem Ponton (2) oder Arbeitsboden und mindestens drei Säulen (3), die in vertikaler Richtung gegenüber dem Ponton oder Arbeitsboden bewegbar und daran befestigbar sind, von denen Säulen mindestens eine im wesentlichen einen vieleckigen horizontalen Querschnitt und auf mindestens einem vertikalen länglichen Winkелеlement (9) eine Zahnung aufweist, die mit in die Öffnungen zwischen den Zähnen der Zahnung hinein beziehungsweise aus ihnen heraus bewegbaren Verriegelungsarmen (5) einer Kupplungs- und Klemmvorrichtung zusammenwirkt, wobei die Kupplungs- und Klemmvorrichtung mit dem Ponton oder Arbeitsplattform verbunden ist, und mit einer Hebevorrichtung (20) zum Betrieb in vertikaler Richtung unter Zusammenwirkung mit der Kupplungs- und Klemmvorrichtung, dadurch gekennzeichnet, dass die Ecken von der oder von jeder vieleckigen Säule (3) aus sich in Längsrichtung erstreckenden Winkelprofilen (9) gebildet sind und die Zahnung als Reihe von am Winkelprofil in regelmässigen Abständen zueinander angebrachten Ausnehmungen (8) ausgebildet ist, von denen sich jede um einen vorbestimmten Abstand von der Ecke nach innen

erstreckt, so dass die Zahnung nicht nach aussen über die entsprechende Ecke der Säule hinaus vortragt.

2. Künstliche Insel oder Arbeitsplattform nach Anspruch 1, dadurch gekennzeichnet, dass bei den Winkelprofilen, die mit der Reihe von die Zahnung bildenden Ausnehmungen (8) versehen sind, die inneren Flächen der Flanschen des Profils ausserhalb der Ausnehmungen durch eine Platte (23), die rechtwinklig zur Winkelhalbierenden des Winkels des betreffenden Profils angeordnet ist, miteinander verbunden sind.

3. Künstliche Insel oder Arbeitsplattform nach Anspruch 1 oder 2, in welcher die Säule oder Säulen, deren Querschnitt vieleckig ist, mit geschlossenen Seitenwänden versehen sind und die Wandung bei den Flanschen der Winkelprofile dicker ist als bei den Wandungsplatten zwischen den Winkelprofilen.

4. Künstliche Insel oder Arbeitsplattform nach einem oder mehreren der vorangehenden Ansprüche, dadurch gekennzeichnet, dass die Verriegelungsarme um eine vertikale Achse in die Zahnung hinein oder aus ihr heraus drehbar sind.

#### Revendications

1. Ile artificielle ou plateforme de travail comportant un ponton (2) ou plancher de travail et au moins trois colonnes (3) pouvant être déplacées en direction verticale par rapport au ponton ou plancher de travail et fixées à celui-ci, colonnes dont au moins l'une présente essentiellement une section droite horizontale polygonale et comporte une denture sur au moins un élément d'angle (9) vertical allongé, denture qui coopère avec des bras de verrouillage (5) d'un mécanisme d'embrayage et de blocage, bras qui peuvent être déplacés pour être introduits dans et extraits hors des ouvertures situées entre les dents de la denture, le mécanisme d'embrayage et de blocage étant relié au ponton ou plancher de travail, ainsi qu'un mécanisme d'ascension (20) fonctionnant en direction verticale en coopérant avec le mécanisme d'embrayage et de blocage, caractérisée en ce que les angles de la ou de chaque colonne (3) polygonale sont formés de profilés de cornière (9) qui s'étendent longitudinalement et que la denture est réalisée sous forme d'une série de logements (8) pratiqués à des distances mutuelles régulières dans le profilé de cornière, ces logements s'étendant chacun vers l'intérieur sur une distance prédéterminée à compter de l'angle, de telle sorte que la denture ne dépasse pas à l'extérieur de l'angle respectif de la colonne.

2. Ile artificielle ou plateforme de travail selon la revendication 1, caractérisée en ce que dans les profilés de cornière comportant la série de logements (8) qui forment la denture les surfaces intérieures des branches du profilé sont reliées entre elles à l'extérieur des logements au moyen d'une plaque (23) disposée transversalement à la bissectrice de l'angle du profilé correspondant.

3. Ile artificielle ou plateforme de travail selon la

revendication 1 ou 2, dans laquelle la ou les colonnes de section droite polygonale sont pourvues de parois latérales closes et l'épaisseur de paroi est plus forte au niveau des branches des profilés de cornière qu'à celui des plaques de paroi situées entre les profilés de cornière.

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4. Ile artificielle ou plateforme de travail selon une ou plusieurs des revendications précédentes, caractérisée en ce que les bras de verrouillage peuvent tourner autour d'un axe vertical pour entrer dans ou ressortir hors de la denture.

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Fig-1

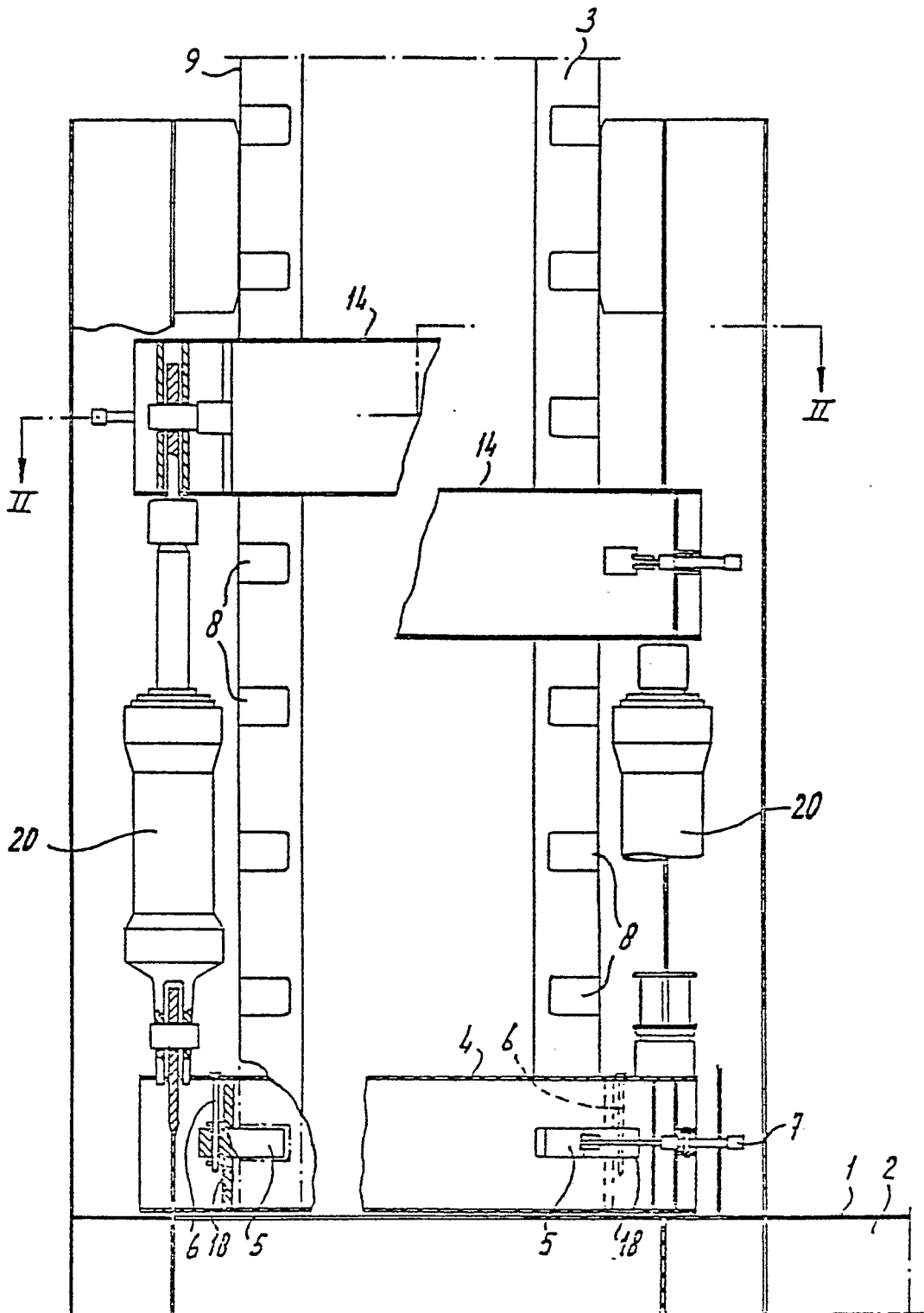
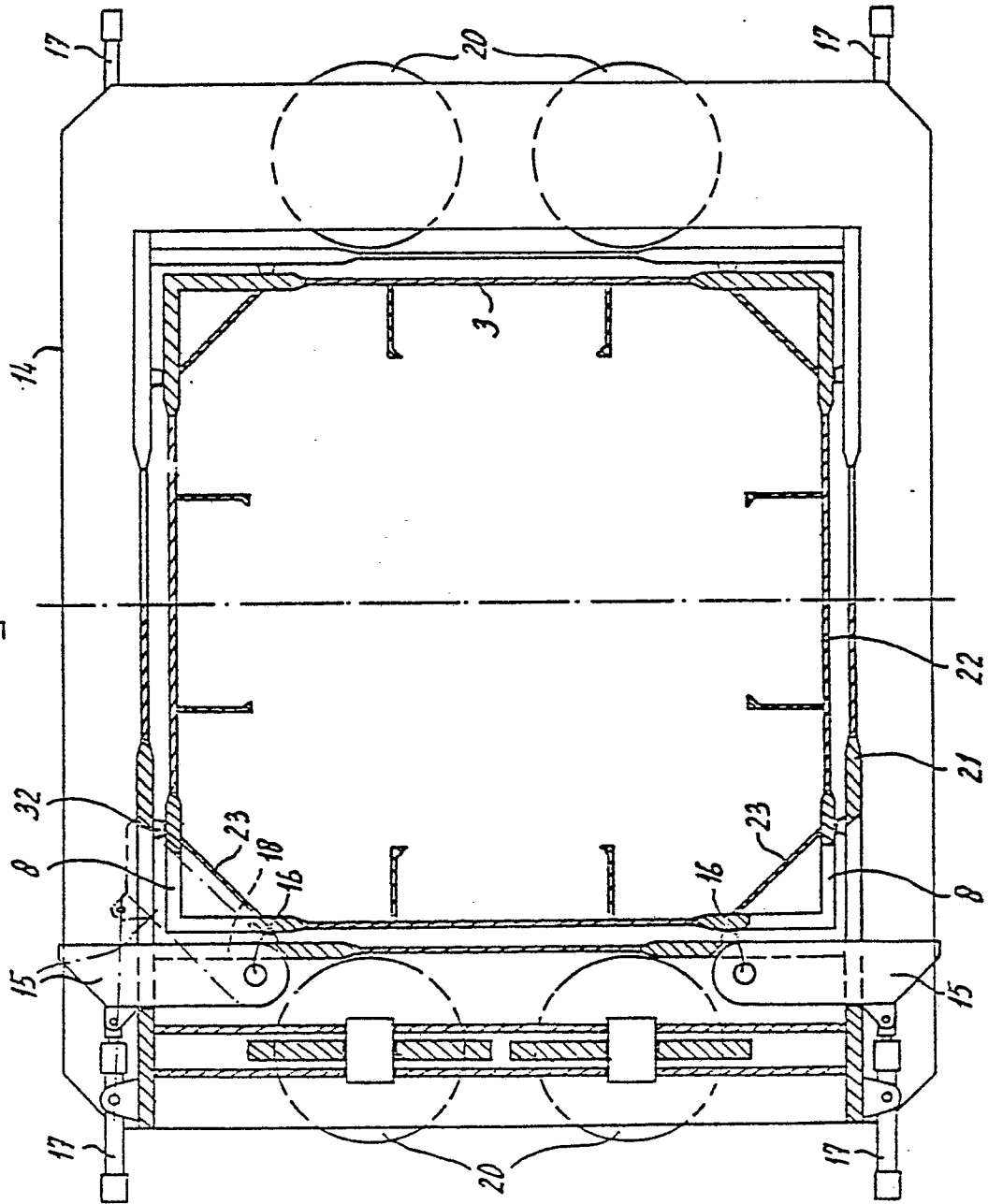


fig-2



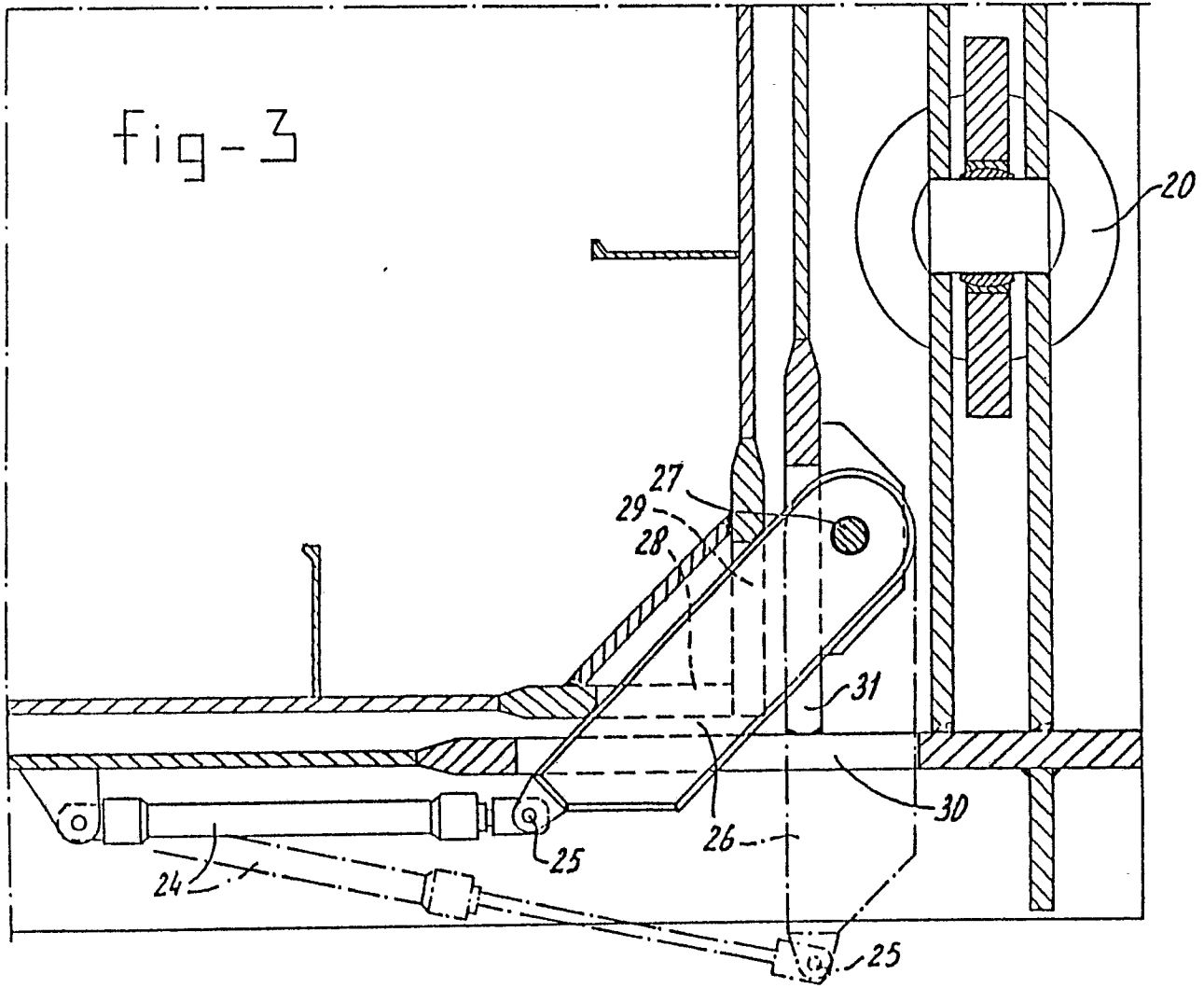




fig-4

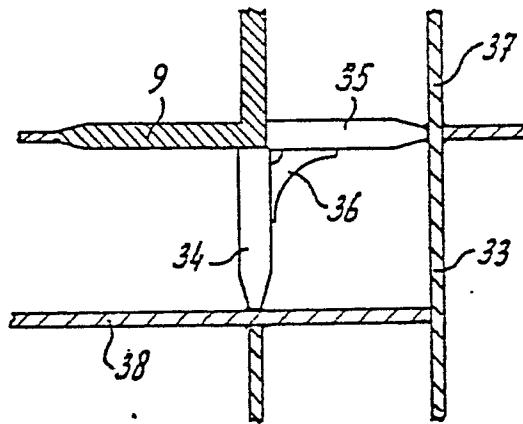


fig-5

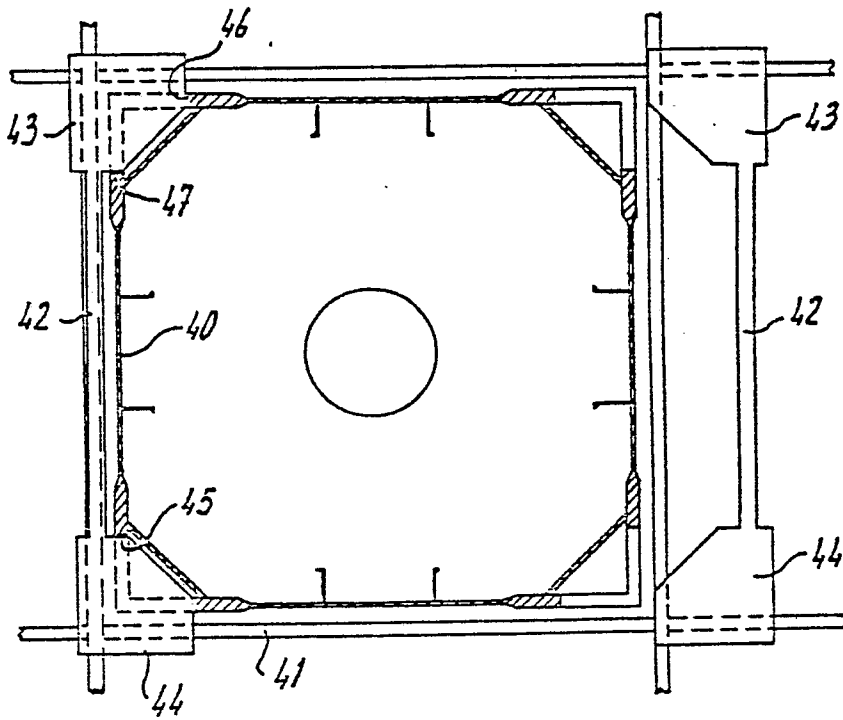


fig-6

