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(54) **A structure for presses, in particular for forming ceramic products**

Rahmenanordnung in Pressen, insbesondere in Pressen für die Herstellung von Keramikgegenständen
Châssis pour presses, en particulier pour presses utilisées dans la fabrication d'éléments en céramique

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Description

[0001] The invention relates to a structure for presses, in particular for forming ceramic products.

[0002] The field of application of the invention is very wide and certainly comprises all possible applications where a forming or plastic deformation is to take place by pressing with the force being applied in a preferably vertical direction.

[0003] Specifically though not exclusively the invention can be utilised in forming ceramic products, especially tiles.

[0004] The prior art teaches hydraulic presses for forming tiles which exhibit a structure connecting all the mobile and fixed parts. These presses are particularly rigid and have a typically closed frame shape, normally with two uprights with access to the work plane from two opposite sides.

[0005] Commonly these tile-forming presses exhibit a free space (as large as possible) between the two uprights or columns (which space constitutes the inlet mouth for the material to be formed). This space is dimensioned on the largest dimension of the rectangle to be pressed, which is the flat surface on which the pressing action is carried out, necessarily discontinuously and intermittently.

[0006] The fact of having a broad introduction face which corresponds to a decidedly smaller depth, is caused largely by the fact that the run of the usual powder material loading truck has to be kept to a minimum in order not to penalise production speed.

[0007] Owing to the considerable space between the two uprights or columns, in the prior art the resistance structure of the press develops in a perpendicular plane with respect to the direction of input of the material to be pressed. This structure is therefore rather wide and high, so much so as in some cases to require partial interment so as to give the structure sufficient stability.

[0008] The height of structures such as the one described above is substantially due to the technical/constructional characteristics, which require the use of a base and an upper crossbeam, connected by the uprights, which have to be very thick - vertically - to guarantee that the two planes absorbing the reactions deriving from the pressing force have a sufficient resistance to deformation.

[0009] These planes are in fact those on which the bottom and top die act.

[0010] For example, in hydraulic presses used in ceramic tile forming which can exert up to a 7000 tonne pressing force, and having a free space between the uprights which is in excess of 2 metres, the total height of the structure can reach above 7 metres, of which about a third is interred.

[0011] In order to guarantee adequate deformability characteristics to these structures, necessary so that they can adapt to any powder loading defects, various technical solutions have been adopted, some of which

are constructionally complex but which are not fully satisfactory.

[0012] Prior art structures for presses are known from the documents GB-A-809 361 and US-A-4 615 208 and US-A-3 527 076; US-A-3 064 558.

[0013] The main aim of the present invention is to overcome these limitations in the prior art by providing a compact, light and structurally simple press.

[0014] A further aim of the invention is to realize a press which is structured according to a modular concept by virtue of which the maximum pressing force can be varied simply and without having to change the input mouth.

[0015] An advantage of the invention consists in the fact that a structure is provided which in comparison with other structures having a similar maximum compression potential is characterized by its considerable lightness and very contained mass.

[0016] A still further advantage of the invention is that it is generally speaking constructionally very simple and, more in particular, its modularity makes it very easy to assemble.

[0017] A yet further advantage of the invention is its compactness, both in terms of transportability and in terms of locatability in the plant of destination.

[0018] Another advantage is that the invention can be used in a ceramic tile production plant, for powder pressing, and more specifically it can be incorporated into a continuous forming line comprising a mobile transport plane for supporting both the material (powders) to be pressed and the formed material ready for pressing by crossing through a forming device (die) coupled to the invention.

[0019] These aims and advantages and more besides are all attained by the combination of features defined in the appended claims.

[0020] Further characteristics and advantages of the present invention will better emerge from the detailed description that follows of a preferred but non-exclusive embodiment of the invention, illustrated purely by way of a nonlimiting example in the accompanying figures of the drawings, in which:

figure 1 shows a schematic front view in vertical elevation;

figure 2 is the same schematic view as in figure 1, relating to a different operative configuration;

figure 3 is a schematic section made according to line I-I of figure 1, with some parts removed better to evidence others;

figure 4 is a schematic section made according to line II-II of figure 1, with some parts removed better to evidence others;

figure 5, in the same section as in figure 3, shows an application of the invention to a ceramic product forming line, especially with regard to ceramic tiles.

[0021] With reference to the above-mentioned figures, 1 denotes in its entirety a resistance element which com-

prises an annular element 2 internally of which two segments 3 are located in diametrically opposite positions.

[0022] The entire element 1 exhibits a flat configuration in which the first two dimensions, width and height, are much greater than the third dimension, depth, which is constant.

[0023] In the plane identified by the first two dimensions, breadth and height, the configuration of the resistance element 1 is symmetrical with respect to two reciprocally perpendicular axes.

[0024] The internal profile of the annular element 2 is substantially constituted by two symmetrical arcs of circumference, reciprocally connected up, to which the first parts of shaped edges 30 of the two opposing segments 3 are coupled.

[0025] In the example, the first portions of the shaped edges 30 have convex profiles and are geometrically shaped such as to be contactingly couplable to the symmetrically opposite corresponding arc-shaped portions constituting part of the internal edge of the annular element 2.

[0026] Constructionally, the annular element 2 and the segments 3 are made from a single sheet of steel cut accordingly.

[0027] The segments 3 are half-moon shaped and exhibit a straight second portion of edge 31 which is opposite to the first portion 30.

[0028] In particular, the second portions 31 are predisposed to be opposite and facing each other at a predetermined distance, in such a way as to identify a space in which a power tool 5 can be housed, which in the example is a press for powder materials. The tool 5 discharges the equal and opposite reactions of the pressing action on the second portions 31.

[0029] The coupling of the first portions 30 in the corresponding arc-shaped portions constituting part of the internal edge of the annular element 2 confers freedom of oscillation on the segments 3 with respect to the annular element 2, so that in any situation a relative adjustment is possible of the segments 3 themselves, which brings them into a position at which the respective second portions 31 are both facing one another and parallel. The illustrated embodiment comprises a plurality of identical said resistance elements 1, arranged facing one another and consecutively aligned at predetermined reciprocal distances.

[0030] Special means maintain the second portions 31 of each resistance element 1 at a predetermined distance. These means also maintain the various resistance elements 1 aligned and a predetermined distances. The means comprise two parallelepiped spacers specially dimensioned and suitable for being interposed between reciprocally facing second portions 31 of the two segments 3 and against opposite tracts of each annular element 2 in such a way that a chamber or free space is defined in which the power tool 5 can be housed.

[0031] The spacers 4 are dimensioned in such a way that their interpositioning with respect to the second por-

tions 31 is fixed by interference.

[0032] The spacing of the resistance elements 1 is realised by virtue of the fact that the spacers 4 exhibit, at the faces thereof turned towards the tracts of the annular elements 2 they are set against, first hollow seatings 40, each of which is predisposed to receive in a joint-arrangement the internal end of a said tract of annular element 2. In the example, the first hollow seatings 40 are equally spaced one from another.

[0033] The spacers 4 further exhibit, at their opposite ends destined to couple with the second portions 31 of the segments 3, second hollow seatings 41, each of which joint-fits with the end portion of a segment 3 bearing a second portion 31. The second hollow seatings 41 are arranged in succession at predetermined distances - in the present example, equal - so that each of them is perfectly centred on a corresponding first hollow seating 40.

[0034] The symmetry of the plurality of resistance elements assembled in the above fashion is obviously equal to the symmetry of each of the resistance elements.

[0035] The vertical axis y-y of symmetry of the element or elements identifies the direction of the resultant of the forces transmitted by the power tool 5 to the two opposite segments 3 of each resistance element. The power tool 5 comprises a lower body 6 and an upper body 7 between which objects or the material to be pressed can be inserted, and a pneumatic piston comprising a chamber 9 into which pressurised fluid is sent and a base 8.

[0036] The chamber 9 is superiorly closed by a diaphragm 10 on an upper surface of which the lower body 6 is situated and bears down.

[0037] The base 8 rests on the surface generated by the second portions 31 of the lower segments 3, while the upper body 7 is maintained in contact with the surface generated by the second parts 31 of the upper segments 3.

[0038] The pressing action is actuated by sending pressurised fluid into the chamber 9 and can be performed on powder material arranged on an upper branch 11 of a ring-wound conveyor belt 10. The upper branch 11 longitudinally crosses the whole press and exhibits a part which is upstream of the press itself, constituting the support on which the powder loads destined to be formed by pressing are prepared, and a part which is downstream of the press, which acts as a conveyor for removing the products (tiles). In the central part, comprised between the upstream and the downstream zones, the branch 11 is comprised between the lower body 6 and the upper body 7, against which the powder material is compressed and formed during the pressing action. During this operation the portion of branch 11 which finds itself between the lower and upper bodies 6 and 7 functions as the lower closure or bottom die of the die. The conveyor is returned via the lower branch 12 housed freely below the body of the press between the two rest feet 13 provided on each resistance element 1, fashioned out of the annular elements 2.

[0039] In addition to the spacing achieved through the

spacers 4, second spacers 14 can be provided, located between the facing surfaces of any two consecutive annular elements 2.

[0040] The structure of the press is free of welded joints and bolts. In rest condition it is held together by the spacers 4 which not only constitute a forced joint, but also hold in position the segments 3 and the annular elements 2 through the joint-couplings with the hollow seatings 41 and 40.

[0041] Mounting the structure is conceptually very simple and requires external equipment for positioning the various elements up until the spacers are forced into place. The interference between the couplings is calculated so as to achieve a pre-load on the annular elements 2 which is usually beneath the maximum pressing force the structure has been designed for. Zeroing the pre-load by application of the pressing force will not modify the reciprocal positioning of the various elements, so the relative positions are guaranteed by the spacers 4.

[0042] The second portions 31 generate the planes to which the base 8, with the piston 6, and the upper body 7, comprising the special die between which the powder is formed and pressed are fixed.

[0043] This enables an equal distribution of the stress load over the annular elements 2 and thus improves the overall resistance capacity of the whole structure, which is in effect modular, and can absorb a total stress load which can be calculated as the sum of the stress loads that each annular element 2 can absorb.

[0044] The special conformation of the single resistance elements 1, determined by the coupling of the segment pairs 3 with the corresponding annular elements 2, enables a particularly advantageous distribution of the stress loads (applied in the y-y axis direction) which induces on each annular element 2 a state of tension distributed so as to exploit the material to the full.

[0045] Thus the resultant structure is 4-5 times lighter than traditional presses.

[0046] The constructional simplicity of the assembly, which requires neither welding nor bolts, leads to considerable economic savings, as costs are reduced.

[0047] The modular structure, while bringing no change to the mouth of the press, enables, for example, the maximum pressing force to be increased simply by adding further resistance elements, thus increasing the productive capacity of each pressing cycle.

[0048] The total stress load that the whole structure can bear is given by the sum of the load capacity of each of the resistance elements 1.

[0049] Further, the small dimensions of the structure mean that it can be easily transported, located and installed in the production plant.

Claims

1. A structure for presses, especially for forming ceramic tiles, comprising a resistance structure consti-

tuted by

- a plurality resistance of elements (1) arranged facing one another each of one comprising an annular element (2) having an internal edge defining arc-shaped portions; the resistance elements (1) being assembled in a modular arrangement and organisation by virtue of which a variation in a number of the elements (1) assembled enables a proportional variation in a maximum absorbable pressing force;

- two segments (3) housed internally of each annular element (2) in opposite positions; said segments (3) exhibiting a first portion (30) of edge which is arc-shaped to couple with a correspondingly arc-shaped portion of the internal edge of each annular element (2); each of said segments (3) also exhibiting a second portion (31) of edge which is opposite to the first portion (30); the coupling of the first portions (30) in the corresponding arc-shaped portions conferring freedom of oscillation to each segment (3) with respect to the corresponding annular element (2), so that in any situation a relative adjustment is possible of the segments (3) themselves, in order to bring the segments (3) into a position at which the respective second portions (31) are both facing one another and parallel;

- means for maintains the second portions (31) of edge of each resistance element (1) at a predetermined distance one from another, said means being housed in a space between the second portions (31);

- at least one power tool (5) which exerts a pressing action by compressing an object or powder material for pressing between two bodies, which power tool (5) is inserted between the facing second portions (31) of edge of said segments (3) in such a way as to transfer to said second portions (31) equal and opposite reactions resulting from said pressing action;

whereby said means comprise two parallelepiped spacers (4), interposed between the facing second portions (31) of the segments (3) and set against two diametrically opposite tracts of each annular element (2) in such a way that a space is created between opposite sides of the two spacers (4) and the second portions (31), in which space the power tool (5) is housed, and in such a way as to maintain the resistance element (1) aligned consecutively at a predetermined reciprocal distance.

2. The structure of claim 1, **characterised in that** the two spacers (4) are dimensioned in such a way that coupling thereof by interposition between the second portions (31) is a fixed interference coupling.

3. The structure of claim 2, **characterised in that** said spacers (4) exhibit, at faces thereof turned towards the annular elements (2), first hollow seatings (40) each of which is predisposed to receive perfectly in a joint confection an internal edge of a tract of annular element (2); said first hollow seatings (40) being predisposed in succession at predetermined distances one from another. 5
4. The structure of claim 3, **characterised in that** said spacers (4) exhibit, at opposite edges thereof and destined to couple with the facing second portions (31) of the segments (3), second hollow seatings (41), each of which is predisposed to receive in a joint-connection an end of a segment (3) bearing said second portion (31); said second hollow seatings (41) being predisposed in succession at predetermined distances one from another, each thereof being centred on a corresponding first hollow seating (40). 10 15 20
5. The structure of claim 2, 3 or 4, **characterised in that** the resistance elements (1) of the plurality of resistance elements (1) each exhibit a flat configuration in which two dimensions, breadth and height, are much greater than a third dimension, depth, which is practically constant; the configuration of each resistance element (1) in each plane of the two prevalent dimensions being symmetrical with respect to the two orthogonal axes of symmetry, one of which identifies a direction of stress transmitted from the power tool (5) to two opposite segments (3). 25 30
6. The structure of claim 5, **characterised in** one of the two orthogonal axes of symmetry is vertical; being the vertical axis of symmetry which identifies the direction of the stress transmitted from the power tool (5) to the two opposite segments (3). 35
7. The structure of claim 6, **characterized in that** said power tool (5) comprises a lower body (6) and an upper body (7) in between which objects or material to be pressed arc inserted; a hydraulic piston being present, comprising a base (8) on which is situated a chamber (9), into which chamber (9) pressurised fluid is sent; said chamber (9) being superiorly closed by a diaphragm (10) on an upper external face of which the entire lower body (6) bears down; said base (8) lying on a surface generated by the second portions (31) of the slower segments (3); the upper body (7) being maintained in contact with a surface generated by the second portions (31) of the upper segments (3). 40 45 50

Patentansprüche

1. Rahmenanordnung für Pressen, insbesondere zum

Formen von Keramikfliesen, enthaltend:

- eine Anzahl von widerstandsfähigen Elementen (1), einander zugewandt angeordnet, wobei ein jedes ein ringförmiges Element (2) mit einem internen Rand enthält, welches bogenförmige Abschnitte beschreibt; wobei die widerstandsfähigen Elemente (1) in einer modularen Anordnung und Organisation zusammengesetzt sind, durch welche eine Veränderung in der Zahl der zusammengesetzten Elemente (1) eine proportionale Veränderung in der maximal absorbierbaren Presskraft erlaubt;
- zwei Segmente (3), aufgenommen im Inneren eines jeden ringförmigen Elementes (2) in sich gegenüberliegenden Positionen; wobei die genannten Segmente (3) einen ersten Randabschnitt (30) aufweisen, welcher bogenförmig ist, um sich mit einem entsprechenden bogenförmigen Abschnitt des inneren Randes von jedem ringförmigen Element (2) zu verbinden; wobei jedes der genannten Segmente (3) ebenfalls einen zweiten Randabschnitt (31) aufweist, welcher dem ersten Abschnitt (30) gegenüberliegend ist; wobei die Verbindung der ersten Abschnitte (30) mit den entsprechenden bogenförmigen Abschnitten einem jeden Segment (3) ein freies Schwingen im Verhältnis zu dem entsprechenden ringförmigen Element (2) verleiht, so dass in jeder Situation eine verhältnismässige Justierung der Segmente (3) selbst möglich ist, um die Segmente (3) in eine Position zu bringen, in welcher die jeweiligen zweiten Abschnitte (31) beide einander zugewandt und parallel sind;
- Mittel, um die zweiten Randabschnitte (31) eines jeden widerstandsfähigen Elementes (1) auf einem vorgegebenen Abstand voneinander zu halten, wobei die genannten Mittel in einem Raum zwischen den zweiten Abschnitten (31) aufgenommen sind;
- Wenigstens ein Leistungswerkzeug (5), welches eine Presswirkung durch Zusammenpressen eines Gegenstandes oder eines Pulvermaterials ausübt, zu pressen zwischen zwei Körpern, welches Leistungswerkzeug (5) zwischen den einander zugewandten zweiten Randabschnitten (31) der genannten Segmente (3) eingesetzt ist, und zwar auf solche Weise, dass auf die genannten zweiten Abschnitte (31) gleiche und entgegengesetzte, sich aus der genannten Presswirkung ergebende Reaktionen übertragen werden;
- wobei die genannten Mittel zwei parallele Abstandsstücke (4) enthalten, eingesetzt zwischen den einander zugewandten zweiten Abschnitten (31) der Segmente (3) und anliegend an zwei sich diametral gegenüberliegenden Abschnitten eines jeden ringförmigen Elementes

- (2) auf solche Weise, dass ein Freiraum zwischen den sich gegenüberliegenden Seiten der beiden Abstandsstücke (4) und den zweiten Abschnitten (31) geschaffen wird, in welchem Freiraum das Leistungswerkzeug (5) aufgenommen ist, und auf solche Weise, dass die widerstandsfähigen Elemente (1) mit einem vorgegebenen gegenseitigen Abstand ausgerichtet bleiben.
2. Rahmenanordnung nach Patentanspruch 1, **dadurch gekennzeichnet, dass** die beiden Abstandsstücke (4) auf solche Weise ausgelegt sind, dass die Verbindung derselben durch das Zwischensetzen zwischen die beiden Abschnitte (31) eine feststehende Interferenzverbindung ist.
3. Rahmenanordnung nach Patentanspruch 2, **dadurch gekennzeichnet, dass** die genannten Abstandsstücke (4) an ihren Flächen, die den ringförmigen Elementen (2) zugewandt sind, erste hohle Sitze (40) aufweisen, jeder von welchen dazu vorgesehen, in einer perfekten passrechten Verbindung einen Innenrand eines Abschnittes des ringförmigen Elementes (2) aufzunehmen; wobei die genannten ersten Hohlen Sitze (40) aufeinanderfolgend in vorgegebenen Abständen voneinander angeordnet sind.
4. Rahmenanordnung nach Patentanspruch 3, **dadurch gekennzeichnet, dass** die genannten Abstandsstücke (4) an ihren sich gegenüberliegenden Kanten zweite hohle Sitze (41) aufweisen, dazu bestimmt, sich mit den zugewandten zweiten Abschnitten (31) der Segmente (3) zu verbinden, und von welchen jeder dazu vorgesehen ist, in einer passrechten Verbindung ein Ende eines den genannten zweiten Abschnitt (31) tragenden Segmentes (3) aufzunehmen; wobei die genannten zweiten hohlen Sitze (41) aufeinanderfolgend mit vorgegebenen Abständen voneinander angeordnet sind, und wobei jeder derselben auf einen entsprechenden ersten hohlen Sitz (40) zentriert ist.
5. Rahmenanordnung nach Patentanspruch 2, 3 oder 4, **dadurch gekennzeichnet, dass** die widerstandsfähigen Elemente (1) der Anzahl von widerstandsfähigen Elementen (1) eine flache Konfiguration aufweisen, in welcher zwei Abmessungen, das heisst Breite und Höhe, viel grösser sind als eine dritte Abmessung, nämlich die Tiefe, welche praktisch konstant bleibt; wobei die Konfiguration eines jeden widerstandsfähigen Elementes (1) in jeder Ebene der beiden vorherrschenden Abmessungen im Verhältnis zu den beiden rechtwinkligen Symmetrieachsen symmetrisch ist, von welchen eine die Richtung der Belastung beschreibt, übertragen von dem Leistungswerkzeug (5) auf die beiden sich gegenüberliegenden Segmente (3).

6. Rahmenanordnung nach Patentanspruch 5, **dadurch gekennzeichnet, dass** eine der beiden rechtwinkligen Symmetrieachsen vertikal verläuft; wobei es die vertikale Symmetrieachse ist, welche die Richtung der Belastung beschreibt, die von dem Leistungswerkzeug (5) auf die beiden sich gegenüberliegenden Segmente (3) übertragen wird.
7. Rahmenanordnung nach Patentanspruch 6, **dadurch gekennzeichnet, dass** das genannte Leistungswerkzeug (5) einen unteren Körper (6) und einen oberen Körper (7) enthält, zwischen welche zu pressende Gegenstände oder Material eingesetzt werden; wobei ein Hydraulikkolben vorhanden ist, enthaltend eine Basis (8), an welcher eine Kammer (9) angeordnet ist, in welche Kammer (9) eine unter Druck stehende Flüssigkeit eingegeben wird; wobei die genannte Kammer (9) oberhalb durch eine Blende (10) verschlossen ist, auf deren obere äussere Fläche der gesamte untere Körper (6) drückt; wobei die genannte Basis (8) auf einer Fläche liegt, erzeugt durch die zweiten Abschnitte (31) der unteren Segmente (3); und wobei der obere Körper (7) im Kontakt mit einer Fläche gehalten wird, erzeugt durch die zweiten Abschnitte (31) der oberen Segmente (3).

Revendications

1. Châssis pour presses, en particulier pour la fabrication de carreaux en céramique, comprenant:
- une pluralité d'éléments résistants (1) disposés de manière opposée entre eux, chacun desquels comprenant un élément annulaire (2) présentant un bord interne définissant des portions en arc de cercle; les éléments résistants (1) étant assemblés dans une disposition et une organisation modulaires en vertu desquelles une variation du nombre d'éléments (1) assemblés permet une variation proportionnelle d'une force de pression absorbable maximum;
 - deux segments (3) logés à l'intérieur de chaque élément annulaire (2) dans des positions opposées; lesdits segments (3) présentant une première portion (30) de bord en forme d'arc de cercle pour s'accoupler avec une correspondante portion en arc de cercle du bord interne de chaque élément annulaire (2); chacun desdits segments (3) présentant également une seconde portion (31) de bord qui est opposée à la première portion (30); l'accouplement des premières portions (30) dans les correspondantes portions en arc de cercle conférant une liberté d'oscillation à chaque segment (3) par rapport au correspondant élément annulaire (2), de manière à ce que soit possible dans chaque situation un relatif ajustement des segments (3) eux-mêmes.

- mes, de manière à porter les segments (3) dans une position en correspondance de laquelle les respectives secondes portions (31) sont aussi bien opposées les unes aux autres que parallèles;
- des moyens de maintenir les secondes portions (31) de bord de chaque élément résistant (1) à une distance prédéterminée l'une de l'autre, lesdits moyens étant logés dans un espace entre les secondes portions (31);
 - au moins un outil de puissance (5) exerçant une action de pression en compressant un objet ou un matériau pulvérulent entre deux corps, lequel outil de puissance (5) est inséré entre les secondes portions opposées (31) du bord desdits segments (3) de manière à transférer auxdites secondes portions (31) des réactions égales et opposées résultant de ladite action de pression; lesdits moyens comprenant deux distanceurs parallélépipédiques (4), interposés entre les secondes portions opposées (31) des segments (3) et disposés contre deux zones diamétralement opposées de chaque élément annulaire (2) de manière à ce qu'un espace soit créé entre des côtés opposés des deux distanceurs (4) et les secondes portions (31), dans lequel espace est logé l'outil de puissance (5), et de manière à maintenir les éléments résistants (1) alignés consécutivement à une distance réciproque prédéterminée.
2. Châssis selon la revendication 1, **caractérisé en ce que** les deux distanceurs (4) sont dimensionnés de manière à ce que leur accouplement par interposition entre les secondes portions (31) soit un accouplement bloqué par interférence.
 3. Châssis selon la revendication 2, **caractérisé en ce que** lesdits distanceurs (4) présentent, sur leurs faces orientées vers les éléments annulaires (2), de premiers logements creux (40), chacun desquels est prédisposé pour recevoir parfaitement dans une liaison à encastrement un bord interne d'une partie d'élément annulaire (2); lesdits premiers logements creux (40) étant prédisposés en succession à des distances prédéterminées entre eux.
 4. Châssis selon la revendication 3, **caractérisé en ce que** lesdits distanceurs (4) présentent, sur leurs bords opposés et destinés à s'accoupler avec les secondes portions opposées (31) des segments (3), des seconds logements creux (41), chacun desquels étant prédisposé pour recevoir dans une liaison à encastrement une extrémité d'un segment (3) supportant ladite seconde portion (31); lesdits seconds logements creux (41) étant prédisposés en succession à des distances prédéterminées entre elles, chacun d'entre eux étant centré sur un premier lo-
- gement creux (40) correspondant.
5. Châssis selon la revendication 2, 3 ou 4, **caractérisé en ce que** les éléments résistants (1) de la pluralité d'éléments résistants (1) présentent chacun une configuration plate dans laquelle deux dimensions, largeur et hauteur, sont bien supérieures à une troisième dimension, l'épaisseur, qui est pratiquement constante; la configuration de chaque élément résistant (1) dans chaque plan des deux dimensions prévalentes étant symétrique par rapport à deux axes orthogonaux de symétrie, l'un desquels identifiant une direction de contrainte transmise de l'outil de puissance (5) à deux segments opposés (3).
 6. Châssis selon la revendication 5, **caractérisé en ce que** l'un des deux axes orthogonaux de symétrie est vertical; l'axe de symétrie étant celui qui identifie la direction de la contrainte transmise de l'outil de puissance (5) aux deux segments opposés (3).
 7. Châssis selon la revendication 6, **caractérisé en ce que** ledit outil de puissance (5) comprend un corps inférieur (6) et un corps supérieur (7) entre lesquels sont insérés les objets ou les matériaux à compresser; un piston hydraulique étant présent, comprenant une base (8) sur laquelle est située une chambre (9), dans laquelle chambre (9) est envoyé un fluide sous pression; ladite chambre (9) étant fermée supérieurement par un diaphragme (10) sur une face externe supérieure duquel tout le corps inférieur (6) repose; ladite base (8) reposant sur une surface générée par les secondes portions (31) des segments inférieurs (3); le corps supérieur (7) étant maintenu en contact avec une surface générée par les secondes portions (31) des éléments supérieurs (3).

Fig.1

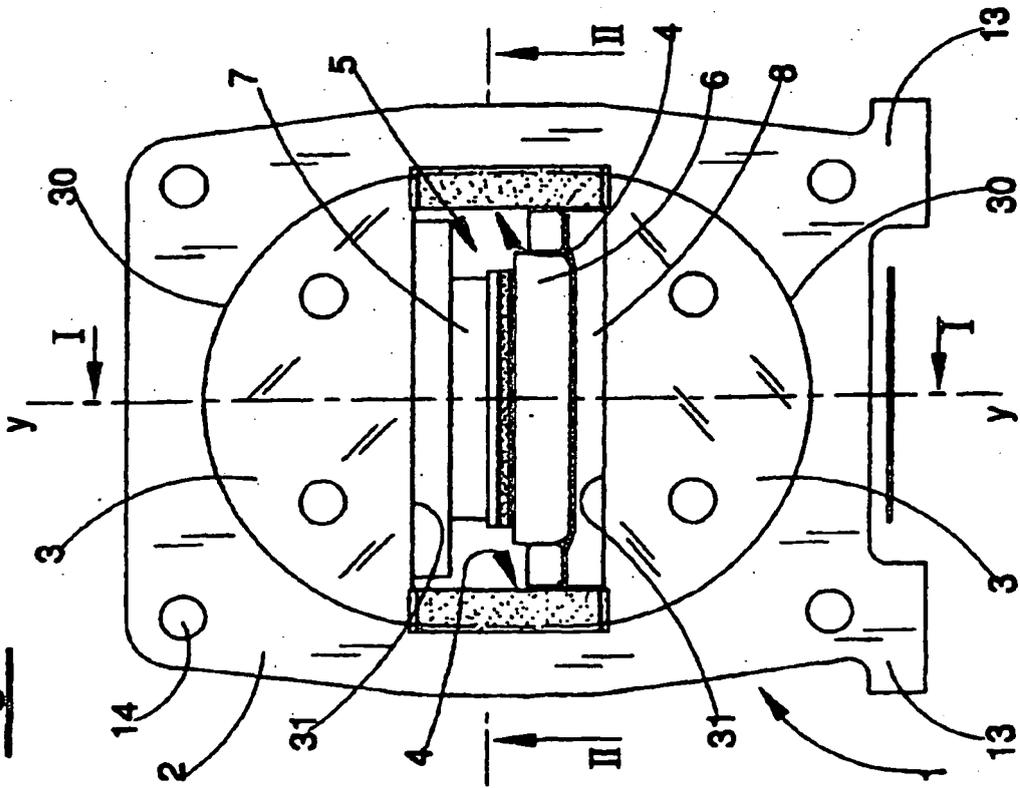
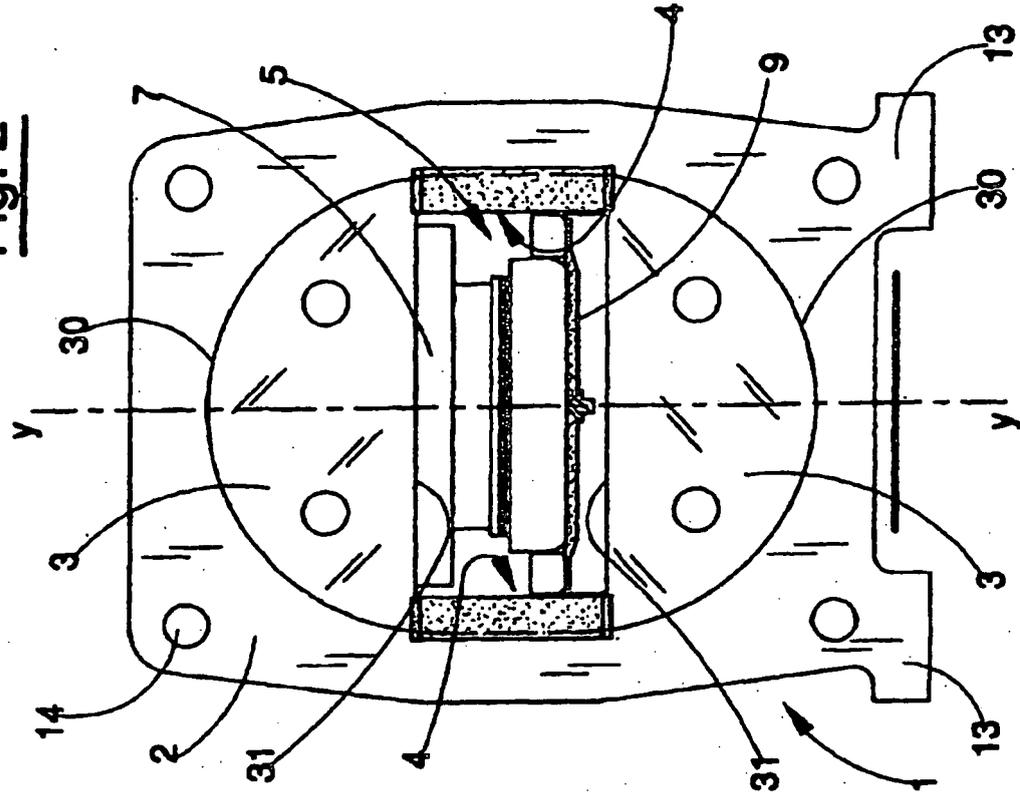
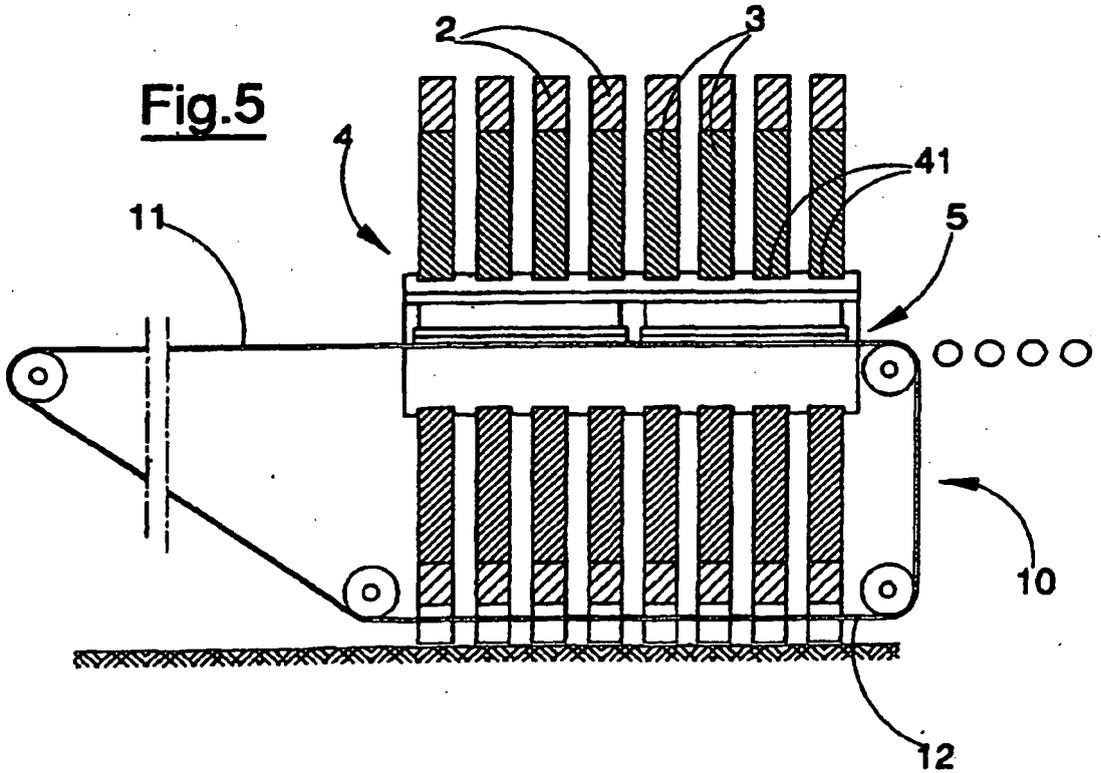
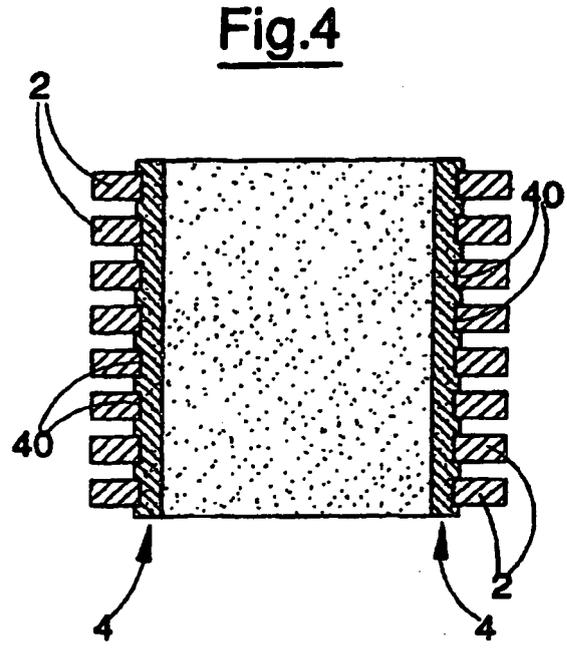
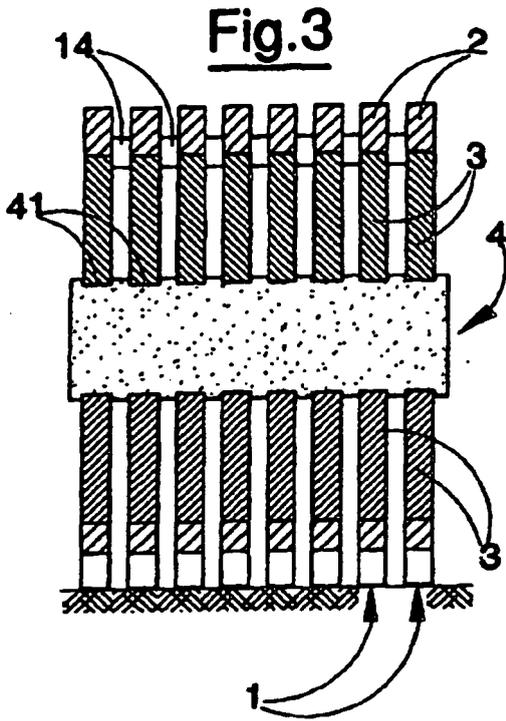


Fig.2





REFERENCES CITED IN THE DESCRIPTION

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