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(54) **Palletising system**

Palletisierungssystem

Système de palletisation

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EP 1 018 472 B1

Description

[0001] The present invention relates to a palletising system for use in the transport and handling of articles or groups of articles.

BACKGROUND TO THE INVENTION:

[0002] Many loads of articles or groups of articles are handled upon pallets using a forklift truck. Whilst such an arrangement may simplify handling of the load at the manufacturer's premises and in subsequent transport to the end user and storage at the end user's premises, such pallets often represent a nuisance to the end user.

[0003] Firstly, the end user must unload the load and its associated pallet from the road trailer or other transport means by which the load is supplied to the end user. Having unloaded the palletised load, the end user must then unpack the load from the pallet. Often, the end user has a large number of such palletised loads in his premises and each load results in an empty pallet which must be removed from the storage area so as not to act as an obstacle to free passage of workmen and machines in the storage area.

[0004] Secondly, having unloaded the pallet and having provided storage for the empty pallet, the end user must then return the empty pallet to the manufacturer or face a charge for the loss of that pallet. As a result, the pallet is handled many times for each delivery of a load to the end user and return to the supplier. This causes wear and tear to the pallet as well as adding cost for the end user.

[0005] Despite these disadvantages in the use of pallets, they are the commonly accepted and used method for handling loads.

[0006] Previous attempts to improve the above technology include US Patent Numbers 2,455,197 and 4,533,290. US 2,455,197 provides a pallet formed from two corrugated plates. This arrangement permits lifting of the pallet by a fork lift from any of four sides. US 4,553,290 provides a fork lift attachment with four laterally displaceable prongs, which enables a reduction in the width of the support plate.

SUMMARY OF THE INVENTION:

[0007] According to one aspect of the present invention there is provided a palletising system as specified in claim 1.

[0008] The invention provides a pallet where the tines can enter passages from all four directions. This is achieved by forming the pallet with two series of passages at right angles to one another so that the tines can enter passages either from either front or back or from either side. Two lines of corrugations can be formed in the same sheet of material to give a structure which comprises a sheet member having a series of upraised dimples extending normally to either side of the plane of the sheet, the dimples being laid out on a grid pattern similar to an egg crate design. The dimples can be provided by metal or other blocks attached at the desired locations on both sides of a metal sheet, but are preferably formed by a suitable vacuum or other moulding technique in a sheet of plastic material. This structure allows the interlocking of pallets for stacking.

[0009] By providing open topped channels in the load bearing pallet, an end user can unload only the load and not the associated pallet from the flat bed of the road truck or other transport means bringing the load onto his premises. The end user thus does not remove the pallet from the truck, so that the pallet can be returned directly to the supplier without having to be handled on the end user's premises. Alternatively, the end user can unload both the pallet and its associated load for storage on site by engaging the tines of the fork lift truck with those channels having a closed top. When the user requires to unpack the load, it can readily be lifted off the pallet and unpacked separately. The unloaded pallet can then be handled by a fork lift truck by inserting the tines of the fork lift truck into the passages which have closed tops. The invention thus enables an end user to avoid the need to handle and store empty pallets on site and minimises handling of such pallets as may remain on site.

[0010] It is preferred that the close top channels have open bottoms. This permits access of fork lift tines from below as well as from one side, and reduces the weight of the pallet.

[0011] The pallet of the invention comprises a generally planar load bearing surface which is adapted to receive the load to be carried by the pallet. The surface is preferably substantially flat and will typically have a square or rectangular plan shape to mimic the load bearing top surface of a conventional pallet. The surface may be a continuous surface, except for the locations at which the open topped channels are positioned.

[0012] The load bearing surface may be provided with underlying support or bracing structures, for example transverse blocks or vertical webs between the side walls of adjacent open topped channels to enhance the strength and rigidity of the pallet.

[0013] A particularly preferred material for use in the manufacture of the pallet of the invention is a moulded polyalkylene polymer sheet, notably a polyethylene or polypropylene sheet. Recycled plastics materials may be used to form the pallet.

[0014] The exact form and thickness of the sheet from which such a pallet is made will depend upon the load which the pallet is to carry. Typically, such a load will be at least 100 kg, usually 500 to 2000 kg, and the sheet can readily be selected from commercially available materials as is known in the industry having regard to the safety and other requirements for pallets to carry such a load.

[0015] The term load bearing is therefore used herein in respect of the pallet of the invention to denote that it

can support a load of at least 100 kg, preferably at least 2000 kg.

[0016] The invention has been described above in terms of a load bearing surface having open topped channels. However, it may be desired to provide such channels with hinged top members which pivot about their longitudinal edges to provide a closed top to the channel, but pivot upwardly to allow a tine located in the underlying channel to pivot the top members aside as the tine rises out of the channel. If desired, the top member may be formed as two opposed half tops, each pivoted to an opposed edge of the lip of the channel to reduce the height of the flap which is formed as the top members are pivoted upwardly by the rising tine. Such top members may be desirable where the pallet is to carry a fluent material contained within a flexible walled bag as opposed to a rigid container or series of rigid articles in a box or shrunk wrapped to form a unitary load.

[0017] The movable tine or tines of the fork lift permit adjustment of the effective number of tines. For example, two tines can become one, or three tines can become one. This means that the fork lift truck can pick up pallets of different sizes. Adjacent tines may be interlocked together to form a single lifting structure. The tines may be moved laterally by any suitable means, for example by means of hydraulics. The tines of the fork lift may be provided as an attachment which is mounted on a suitable vehicle. Accordingly, another aspect of the invention provides an attachment for the rise and fall mechanism of a fork lift truck or the front end loader of a tractor as specified in claim 7.

[0018] Although the pallet and the fork lift form the system, these items could also be manufactured and sold separately, and could be used separately. Accordingly, another aspect of the invention provides a pallet as specified in claim 9.

DESCRIPTION OF THE DRAWINGS:

[0019] The invention will now be further described by way of illustration, with reference to the following drawings in which:

Figure 1 is a diagrammatic cross sectional view through one form of a pallet in accordance one aspect of the invention;

Figure 2 is a plan view of another embodiment of a pallet in accordance with the invention;

Figure 3 is a side elevational view of the pallet shown in Figure 2;

Figure 4 is a perspective view of part of the pallet shown in Figure 2;

Figure 5 is a side elevational view of an attachment for a fork lift in accordance with another aspect of the invention;

Figure 6 illustrates diagrammatically an alternative attachment for a fork lift truck;

Figure 7 is a diagrammatic illustration of another alternative attachment for a fork lift truck; and

Figure 8 shows side elevational views of interlocking tines of differing sectional shapes in accordance with another aspect of the invention.

DETAILED DESCRIPTION:

[0020] The pallet shown in Figure 1 comprises a sheet member 1 which has been formed into corrugations 2, some of which have an open top 3, and intermediate ones which have a closed top but an open bottom face 4. Typically, such a sheet is made by casting a polyethylene resin about metal rod or glass fibre reinforcement. The plan dimensions of the pallet are typically 0.5 to 1.5 metres wide and 1 to 2 metres front to back. The pallet is typically from 5 to 10 cm deep vertically and the corrugations are typically from 4 to 9 cm deep and from 5 to 10 cm wide.

[0021] In use, a load 5 is placed upon the top face of the pallet. A pair of tines 10 of a fork lift truck are inserted into a pair of the closed top channels 4. When the tines are raised, they engage the closed top of the channel and lift the pallet and load with them. If the tines are placed in a pair of open topped channels 3 (as shown by 10') raising the tines brings them into direct contact with the base of the load 5 so as to lift the load without lifting the pallet. If desired the fork lift mechanism can have more than two tines, for example as many as seven or eight, so as to increase and spread the effective load bearing and stiffening surface of the tines. The user can thus handle the load and pallet together or can separate the load from the pallet. The unloaded pallet can thus remain upon the flat bed of the road or rail truck in which it is supplied to the end user for return to the supplier without the need for the end user to handle the pallet. The wear and tear damage to the pallet during handling is thus minimised.

[0022] The pallet shown in Figures 2-4 comprises a sheet of reinforced plastic or metal 20 having a plurality of dimples 21, 22 formed therein on a grid pattern. The dimples 21 extend above the plane of the sheet, and the dimples 22 extend below the plane of the sheet in the manner of an egg box. The dimples provide crossing channels 3, 4 on each side of the sheet so that the tines of the fork lift truck can enter from any one of the four sides of the pallet. The dimples on the underside of the sheet form channels with closed tops, those on the upper face of the sheet forming open topped channels. When a tine is inserted into the channel between dimples on the lower face of the sheet, it will raise both the

sheet and any load carried on the upper ends of the dimples on the top face of the sheet.

[0023] The tops of the upper dimples 21 form a generally planar load carrying surface which in this example has a greater area than the bottoms of the lower dimples 22.

[0024] Six channels are illustrated here, allowing access from all four side directions. Preferably the pallet has between three and ten channels, preferably in each direction.

[0025] Figure 5 shows an attachment for the front end loader of a tractor or for fitting to the rise and fall mechanism of a fork lift truck. This attachment comprises a support frame 30 which has mounting hooks 31 for mounting the attachment on a fork lift carriage. The support frame 30 carries a series of laterally spaced apart projecting tines 10, the number and spacing of which can be selected to suit the spacing of the channels 3 and 4 in the pallet. Eight tines are illustrated, but the number is preferably between four and eight. The two outermost tines 10 are mounted slidably to the frame 30 and can be moved laterally towards or away from their neighbouring tines by hydraulic rams. Each outermost tine can be brought up into contact with its neighbour so that they interlock to form a single load bearing member which can fit into a single channel 3, 4. The effective number of tines can therefore be adjusted between 6, 7 and 8 depending on the number of channels in the pallet to be engaged. Other tines could also be laterally movable to allow the attachment to accommodate different channel spacings and to square up the machine or a pallet mounted on the tines 10. Examples of tines which are engaged with each other are shown in Figure 8. Figure 8a illustrates generally circular section tines 10a, 10b interlocking, and Figures 8b and 8c illustrate interlocking of, respectively, three tines 10c, 10d, 10e and two tines 10f and 10g to form effectively single larger tines.

[0026] If desired, the frame 30 can carry a pusher mechanism 33 which is actuated by an hydraulic ram 32 or the like to engage with the load 5 on the pallet so that it can be pushed off the tines 10 when it has been raised off the pallet and onto a suitable storage or work surface, as illustrated in Figures 6 and 7. The pusher mechanism 33 may be connected to the frame 30 by a straight linkage or a pivoted linkage 35, via a pivot point 40. Figure 7 also shows an optional pallet engaging member 34 which can be used to grab an empty pallet and pull it onto the tines 10 of the fork lift. The pallet engaging member 34 is a hook which held in place in a dimple 22 in the pallet by a releasable latch mechanism, for example hydraulic, mechanical or electronic. In this example the latch mechanism is provided by a spring and hydraulically activated pin.

Claims

1. A palletising system for use in the transport and handling of articles or groups of articles (5), comprising at least one pallet (1, 20) and a fork lift;

   the or each pallet (1, 20) comprising a load bearing generally planar surface and a structure located beneath the plane of the surface having a plurality of channels (3, 4) therein to receive the tines (10) of a fork lift truck whereby the pallet (1, 20) and its associated load (5) can be handled by the fork lift, the pallet (1, 20) having alternating closed (4) and open (3) top channels in the structure underlying the load bearing surface, the open top channels (3) permitting tines (10) of a fork lift truck when located in at least some of those channels (3) to engage the base of a load (5) carried upon the pallet directly so that the load can be lifted free from the pallet, and the close top channels (4) permitting tines (10) of a fork lift truck when located in at least some of those channels (4) to engage the top of the channels to raise the pallet and any load carried on the pallet, wherein the pallet has a structure similar to an egg crate, with the open top channels (3) being defined between upwardly projecting dimples (21), and the closed top channels (4) being defined between downwardly projecting dimples (22), such that said fork lift tines may be inserted from any of four sides of the pallet to allow either lifting of the load from the pallet or lifting of the pallet and any load carried on the pallet;

   the fork lift comprising a plurality of laterally spaced apart tines (10) for engaging in channels (3, 4) of the pallet, and means for raising and lowering the tines; wherein at least one of the tines (10) is laterally moveable towards an adjacent tine, the said movable tine (10) and the said adjacent tine (10) are interlockable so that when the said tines (10) are brought together they interlock to form a single lifting structure which may be inserted into a single channel (3, 4) in the pallet (1, 20).

2. A palletising system as claimed in claim 1, wherein the pallet is a moulded plastics material.

3. A palletising system as claimed in claim 1 or claim 2 wherein at least some of the close top channels (4) are open at the bottom.

4. A palletising system as claimed in any one of the preceding claims, wherein at least one of the open top channels (3) is provided with a hinged top member which can pivot about a hinge to provide a closed top to the channel (3).

5. A palletising system as claimed in any one of the preceding claims, wherein the laterally spaced apart tines (10) are mounted on an attachment (30)

for the front end loader of a tractor or the fall and rise mechanism of a fork lift truck.

6. A palletising system as claimed in any one of the preceding claims, wherein the fork lift has between four and eight tines (10), the two outermost tines being laterally adjustable so that each can be brought into close proximity or engagement with its neighbour whereby the effective number of tines can be reduced by one or two.

7. An attachment (30) for the front end loader of a tractor or the fall and rise mechanism of a fork lift truck, to provide a fork lift suitable for use in the system of claim 1, the attachment comprising a frame (30) which has a plurality of laterally spaced apart projecting tines (10), at least one of the tines being laterally moveable towards and away from an adjacent tine (10), the said movable tine (10) and the said adjacent tine (10) are interlockable so that when the said tines (10) are brought together they interlock to form a single lifting structure.

8. An attachment (30) as claimed in claim 7, further including pallet engaging means (33) for engaging with a surface of a pallet to enable the pallet to be pulled on to the tines (10) of the attachment.

9. A pallet (1, 20) suitable for use in the palletising system of claim 1, comprising a load bearing generally planar surface and a structure located beneath the plane of the surface having a plurality of channels (3, 4) therein to receive the tines (10) of a fork lift truck whereby the pallet (1, 20) and any associated load (5) can be handled by the fork lift, the pallet (1, 20) having alternating closed (4) and open (3) top channels in the structure underlying the load bearing surface, the open top channels (3) permitting tines (10) of a fork lift truck when located in at least some of those channels (3) to engage the base of a load (5) carried upon the pallet directly so that the load can be lifted free from the pallet, and the close top channels (4) permitting tines (10) of a fork lift truck when located in at least some of those channels (4) to engage the top of the channels to raise the pallet and any load carried on the pallet; **characterized in that** the pallet has a structure similar to an egg crate, with the open top channels (3) being defined between upwardly projecting dimples (21), and the closed top channels (4) being defined between downwardly projecting dimples (22) such that said fork lift tines may be inserted from any of four sides of the pallet to allow either lifting of the load from the pallet or lifting of the pallet and any load carried on the pallet.

10. A pallet as claimed in claim 9, wherein at least some of the close top channels (4) are open at the bottom.

11. A pallet as claimed in claim 9 or claim 10, comprising a moulded plastics material.

Patentansprüche

1. Palettiersystem zur Verwendung beim Transport und bei der Handhabung von Artikeln oder Gruppen von Artikeln (5), wobei das System mindestens eine Palette (1, 20) und einen Gabelstapler umfaßt;
wobei die oder jede Palette (1, 20) eine lasttragende, allgemein planare Oberfläche und eine unterhalb der Ebene der Oberfläche befindliche Konstruktion mit mehreren darin vorgesehenen Kanälen (3, 4), um die Gabeln (10) eines Gabelstaplers aufzunehmen, umfaßt, so daß die Palette (1, 20) und ihre dazugehörige Ladung (5) vom Gabelstapler gehandhabt werden können, wobei die Palette (1, 20) in der unterhalb der lasttragenden Oberfläche befindlichen Konstruktion abwechselnd oben geschlossene (4) und oben offene (3) Kanäle besitzt, wobei die oben offenen Kanäle (3) es den Gabeln (10) eines Gabelstaplers, wenn sie sich in mindestens einigen dieser Kanäle (3) befinden, ermöglichen, in die Basis einer auf der Palette getragenen Ladung (5) direkt einzugreifen, so daß die Ladung von der Palette abgehoben werden kann, und wobei die oben geschlossenen Kanäle (4) es den Gabeln (10) eines Gabelstaplers, wenn sie sich in mindestens einigen dieser Kanäle (4) befinden, ermöglichen, die Oberseite der Kanäle in Eingriff zu nehmen, um die Palette und eine gegebenenfalls auf der Palette getragene Ladung anzuheben, wobei die Palette eine einem Eierkarton ähnliche Konstruktion aufweist, wobei die oben offenen Kanäle (3) zwischen nach oben ragenden Vertiefungen (21) und die oben geschlossenen Kanäle (4) zwischen nach unten ragenden Vertiefungen (22) definiert sind, so daß die Gabeln des Gabelstaplers von jeder beliebigen der vier Seiten der Palette aus eingeführt werden können, um entweder ein Abheben der Ladung von der Palette oder ein Anheben der Palette und einer gegebenenfalls auf der Palette getragenen Last zu ermöglichen;
wobei der Gabelstapler mehrere seitlich beabstandete Gabeln (10) zum Eingriff in die Kanäle (3, 4) der Palette sowie Mittel zum Anheben und Absenken der Gabeln umfaßt, wobei mindestens eine der Gabeln (10) zu einer benachbarten Gabel hin seitlich bewegbar ist, wobei die bewegbare Gabel (10) und die benachbarte Gabel (10) verriegelbar sind, so daß sich die Gabeln (10), wenn sie zusammengeführt werden, miteinander verriegeln, um eine einzige Hebekonstruktion zu bilden, die in einen einzelnen Kanal (3, 4) in der Palette (1, 20) eingeführt werden kann.

2. Palettiersystem nach Anspruch 1, bei dem es sich

bei der Palette um ein geformtes Kunststoffmaterial handelt.

3. Palettiersystem nach Anspruch 1 oder Anspruch 2, bei dem zumindest einige der oben geschlossenen Kanäle (4) am Boden offen sind.

4. Palettiersystem nach einem der vorstehend aufgeführten Ansprüche, bei dem mindestens einer der oben offenen Kanäle (3) mit einem schwenkbaren oberen Element ausgestattet ist, das um ein Drehgelenk schwenkbar ist, um einen oben geschlossenen Kanal (3) bereitzustellen.

5. Palettiersystem nach einem der vorstehend aufgeführten Ansprüche, bei dem die seitlich beabstandeten Gabeln (10) an einer Halterung (30) für die Frontladevorrichtung eines Traktors oder am Hebe- und Absenkmechanismus eines Gabelstaplers montiert sind.

6. Palettiersystem nach einem der vorstehend aufgeführten Ansprüche, bei dem der Gabelstapler vier bis acht Gabeln (10) besitzt, wobei die beiden äußersten Gabeln seitlich einstellbar sind, so daß jede nahe an ihre benachbarte Gabel oder in Eingriff damit gebracht werden kann, wodurch die wirksame Anzahl der Gabeln um eine oder zwei reduziert werden kann.

7. Halterung (30) für die Frontladevorrichtung eines Traktors oder den Hebe- und Absenkmechanismus eines Gabelstaplers, um einen Gabelstapler bereitzustellen, der für eine Verwendung im System nach Anspruch 1 geeignet ist, wobei die Halterung einen Rahmen (30) umfaßt, der mehrere seitlich beabstandete, vorragende Gabeln (10) besitzt, wobei mindestens eine der Gabeln zu einer benachbarten Gabel (10) hin oder davon weg seitlich bewegbar ist, wobei die bewegbare Gabel (10) und die benachbarte Gabel (10) verriegelbar sind, so daß sich die Gabeln (10), wenn sie zusammengeführt werden, miteinander verriegeln, um eine einzige Hebekonstruktion zu bilden.

8. Halterung (30) nach Anspruch 7, die weiterhin Palletteneingriffsmittel (33) zum Eingriff mit einer Oberfläche einer Palette beinhaltet, damit die Palette auf die Gabeln (10) der Halterung gezogen werden kann.

9. Palette (1, 20), die zur Verwendung im Palettiersystem nach Anspruch 1 geeignet ist, wobei die Palette eine lasttragende, allgemein planare Oberfläche und eine unterhalb der Ebene der Oberfläche befindliche Konstruktion mit mehreren darin vorgesehenen Kanälen (3, 4), um die Gabeln (10) eines Gabelstaplers aufzunehmen, umfaßt, so daß die Palette (1, 20) und jegliche dazugehörige Ladung (5) vom Gabelstapler gehandhabt werden können, wobei die Palette (1, 20) in der unterhalb der lasttragenden Oberfläche befindlichen Konstruktion abwechselnd oben geschlossene (4) und oben offene (3) Kanäle besitzt, wobei die oben offenen Kanäle (3) es den Gabeln (10) eines Gabelstaplers, wenn sie sich in mindestens einigen dieser Kanäle (3) befinden, ermöglichen, die Basis einer auf der Palette getragenen Ladung (5) direkt in Eingriff zu nehmen, so daß die Ladung von der Palette abgehoben werden kann, und wobei die oben geschlossenen Kanäle (4) es den Gabeln (10) eines Gabelstaplers, wenn sie sich in mindestens einigen dieser Kanäle (4) befinden, ermöglichen, die Oberseite der Kanäle in Eingriff zu nehmen, um die Palette und eine gegebenenfalls auf der Palette getragene Ladung anzuheben; **dadurch gekennzeichnet, daß** die Palette eine einem Eierkarton ähnliche Konstruktion aufweist, wobei die oben offenen Kanäle (3) zwischen nach oben ragenden Vertiefungen (21) und die oben geschlossenen Kanäle (4) zwischen nach unten ragenden Vertiefungen (22) definiert sind, so daß die Gabeln des Gabelstaplers von jeder beliebigen der vier Seiten der Palette aus eingeführt werden können, um entweder ein Abheben der Ladung von der Palette oder ein Anheben der Palette und einer gegebenenfalls auf der Palette getragenen Ladung zu ermöglichen.

10. Palette nach Anspruch 9, bei der zumindest einige der oben geschlossenen Kanäle (4) am Boden offen sind.

11. Palette nach Anspruch 9 oder Anspruch 10, die ein geformtes Kunststoffmaterial umfaßt.

Revendications

1. Système de palettisation destiné au transport et à la manutention d'articles ou de groupes d'articles (5), comprenant au moins une palette (1, 20) et un chariot élévateur à fourche ;

la ou chaque palette (1, 20) comportant une surface globalement plane de support de charge et une structure située sous le plan de la surface, comportant une pluralité de canaux (3, 4) afin de recevoir les bras (10) d'un chariot élévateur à fourche, grâce à quoi la palette (1, 20) et sa charge correspondante (5) peuvent être manipulées par le chariot élévateur à fourche, la palette (1, 20) ayant des canaux supérieurs alternativement fermés (4) et ouverts (3) dans la structure au-dessous de la surface de support de charge, les canaux supérieurs ouverts (3) permettant aux bras d'un chariot élévateur à fourche, lorsqu'ils sont placés dans au moins certains de ces canaux (3), de coopérer directe-

ment avec la base d'une charge (5) portée par la palette de façon que la charge puisse être soulevée sans la palette, et les canaux supérieurs fermés (4) permettant aux bras (10) d'un chariot élévateur à fourche, lorsqu'ils sont placés dans au moins certains de ces canaux (4), de coopérer avec le haut des canaux pour lever la palette et toute charge portée par la palette, système dans lequel la palette a une structure semblable à une boite à oeufs, les canaux supérieurs ouverts (3) étant définis entre des reliefs (21) faisant saillie vers le haut, et les canaux supérieurs fermés (4) étant définis entre des reliefs (22) faisant saillie vers le bas, de façon que lesdits bras du chariot élévateur à fourche puissent être introduits depuis l'un quelconque des quatre côtés de la palette afin de permettre le levage de la charge au-dessus de la palette ou le levage de la palette et de toute charge portée par la palette ;

le chariot élévateur à fourche comportant plusieurs bras (10) espacés latéralement les uns des autres et destinés à s'engager dans les canaux (3, 4) de la palette, et un moyen pour lever et abaisser les bras ; système dans lequel au moins un des bras (10) peut être rapproché latéralement d'un bras adjacent, ledit bras mobile (10) et ledit bras adjacent (10) peuvent être assujettis l'un à l'autre pour que, lorsque lesdits bras (10) sont rapprochés l'un de l'autre, ils soient assujettis l'un à l'autre pour former une seule structure de levage pouvant être introduite dans un seul canal (3, 4) de la palette (1, 20).

2. Système de palettisation selon la revendication 1, dans lequel la palette est en matière plastique moulée.

3. Système de palettisation selon la revendication 1 ou la revendication 2, dans lequel au moins certains des canaux supérieurs fermés (4) sont ouverts dans le fond.

4. Système de palettisation selon l'une quelconque des revendications précédentes, dans lequel au moins un des canaux supérieurs ouverts (3) comporte un élément supérieur articulé qui peut pivoter autour d'une charnière pour constituer un couvercle fermé du canal (3).

5. Système de palettisation selon l'une quelconque des revendications précédentes, dans lequel les bras (10) espacés latéralement les uns des autres sont montés sur un accessoire (30) pour le chargeur frontal d'un véhicule tracteur ou pour le mécanisme d'abaissement et d'élévation d'un chariot élévateur à fourche.

6. Système de palettisation selon l'une quelconque des revendications précédentes, dans lequel le chariot élévateur à fourche comporte entre quatre et huit bras (10), les deux bras les plus à l'extérieur étant réglables latéralement de façon que chacun puisse être placé tout près ou au contact de son voisin, grâce à quoi le nombre effectif de bras peut être réduit d'une ou deux unités.

7. Accessoire (30) pour le chargeur frontal d'un véhicule tracteur ou pour le mécanisme d'abaissement et d'élévation d'un chariot élévateur à fourche, afin de réaliser un chariot élévateur à fourche utilisable dans le système selon la revendication 1, l'accessoire comprenant un cadre (30) comportant plusieurs bras saillants (10) espacés latéralement les uns des autres, au moins un des bras étant rapprochable ou éloignable latéralement d'un bras adjacent (10), ledit bras mobile (10) et ledit bras adjacent (10) peuvent être assujettis l'un à l'autre de façon que, lorsque lesdits bras (10) sont rapprochés l'un de l'autre, ils soient assujettis l'un à l'autre pour former une seule structure de levage.

8. Accessoire (30) selon la revendication 7, comprenant en outre un moyen d'engagement (33) de palette destiné à s'engager contre une surface d'une palette pour permettre à la palette d'être tirée jusque sur les bras (10) de l'accessoire.

9. Palette (1, 20) utilisable dans le système de palettisation selon la revendication 1, comprenant une surface globalement plane de support de charge et une structure située sous le plan de la surface, comportant plusieurs canaux (3, 4) afin de recevoir les bras (10) d'un chariot élévateur à fourche, grâce à quoi la palette (1, 20) et toute charge correspondante (5) peuvent être manipulées par le chariot élévateur à fourche, la palette (1, 20) ayant des canaux supérieurs alternativement fermés (4) et ouverts (3) dans la structure sous la surface de support de charge, les canaux supérieurs ouverts (3) permettant aux bras (10) d'un chariot élévateur à fourche, lorsqu'ils sont situés dans au moins certains de ces canaux (3), de coopérer directement avec la base d'une charge (5) portée par la palette de façon que la charge puisse être soulevée sans la palette, et les canaux supérieurs fermés (4) permettant aux bras (10) d'un chariot élévateur à fourche, lorsqu'ils sont situés dans au moins certains de ces canaux (4), de coopérer avec le haut des canaux pour lever la palette et toute charge portée par la palette ; **caractérisée en ce que** la palette a une structure semblable à une boite à oeufs, les canaux supérieurs ouverts (3) étant définis entre des reliefs (21) faisant saillie vers le haut et les canaux supérieurs fermés (4) étant définis entre des reliefs (22) faisant saillie vers le bas de façon que lesdits bras de chariot élévateur à fourche puissent être introduits depuis l'un quelconque des quatre côtés de la palette afin de permettre soit le levage de la charge au-des-

sus de la palette soit le levage de la palette et de toute charge portée par la palette.

10. Palette selon la revendication 9, dans laquelle au moins certains des canaux supérieurs fermés (4) sont ouverts dans le fond.

11. Palette selon la revendication 9 ou la revendication 10, en matière plastique moulée.

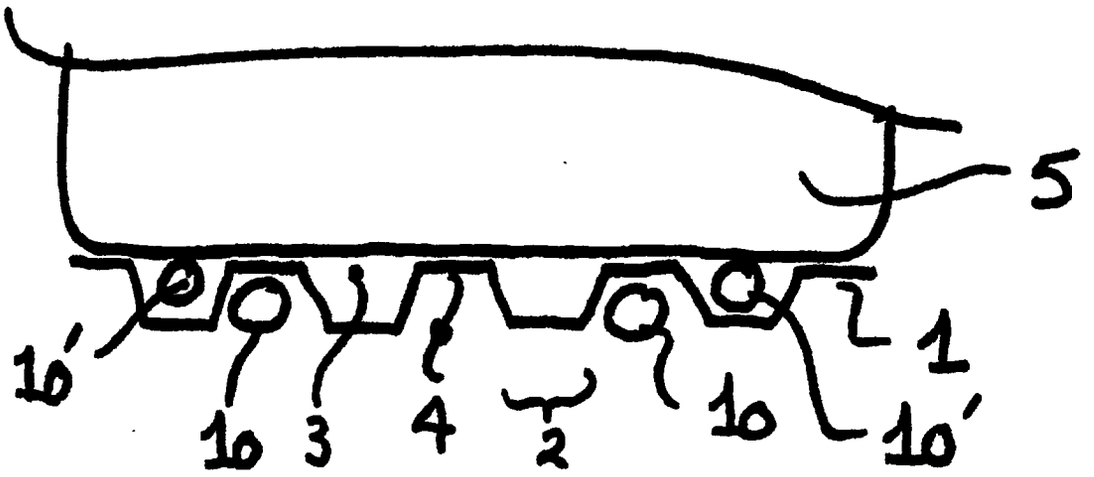


FIG. 1

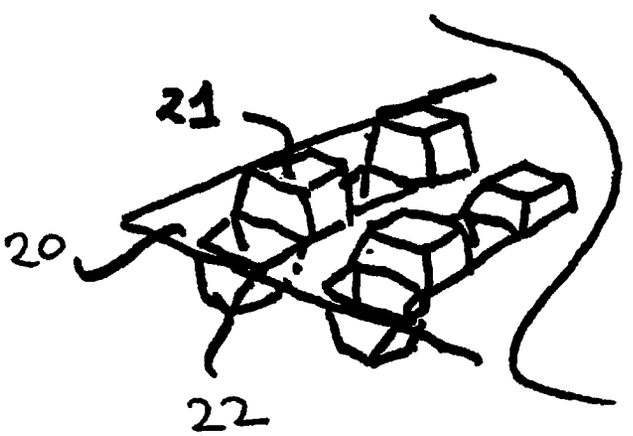


FIG. 4

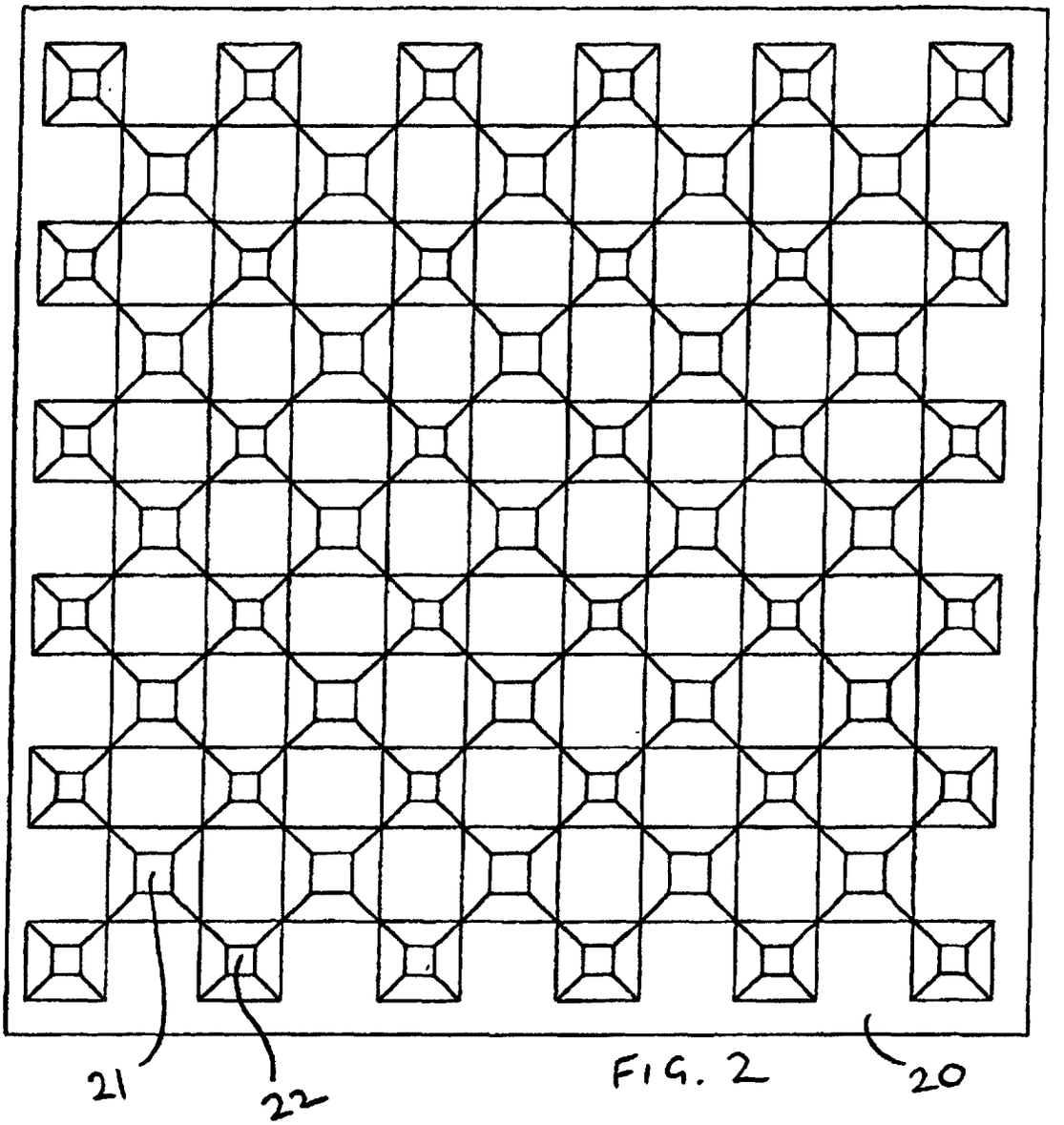


FIG. 2

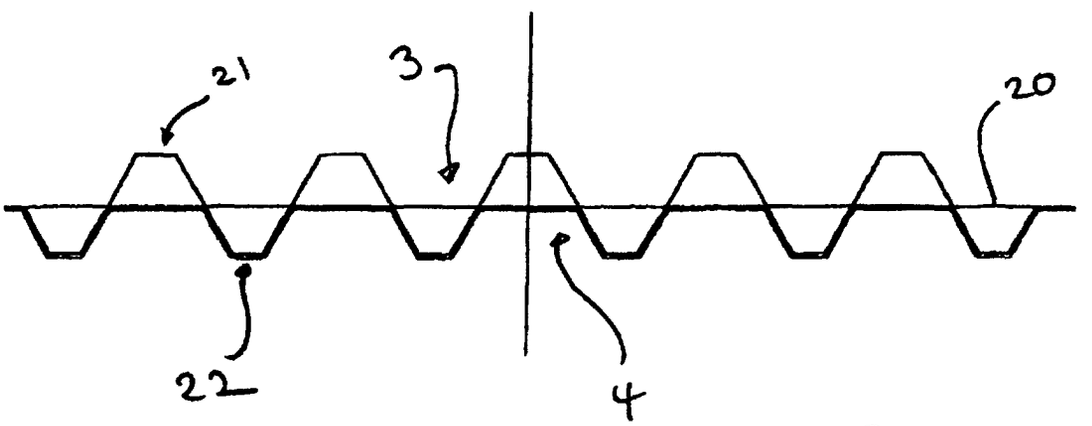


FIG. 3

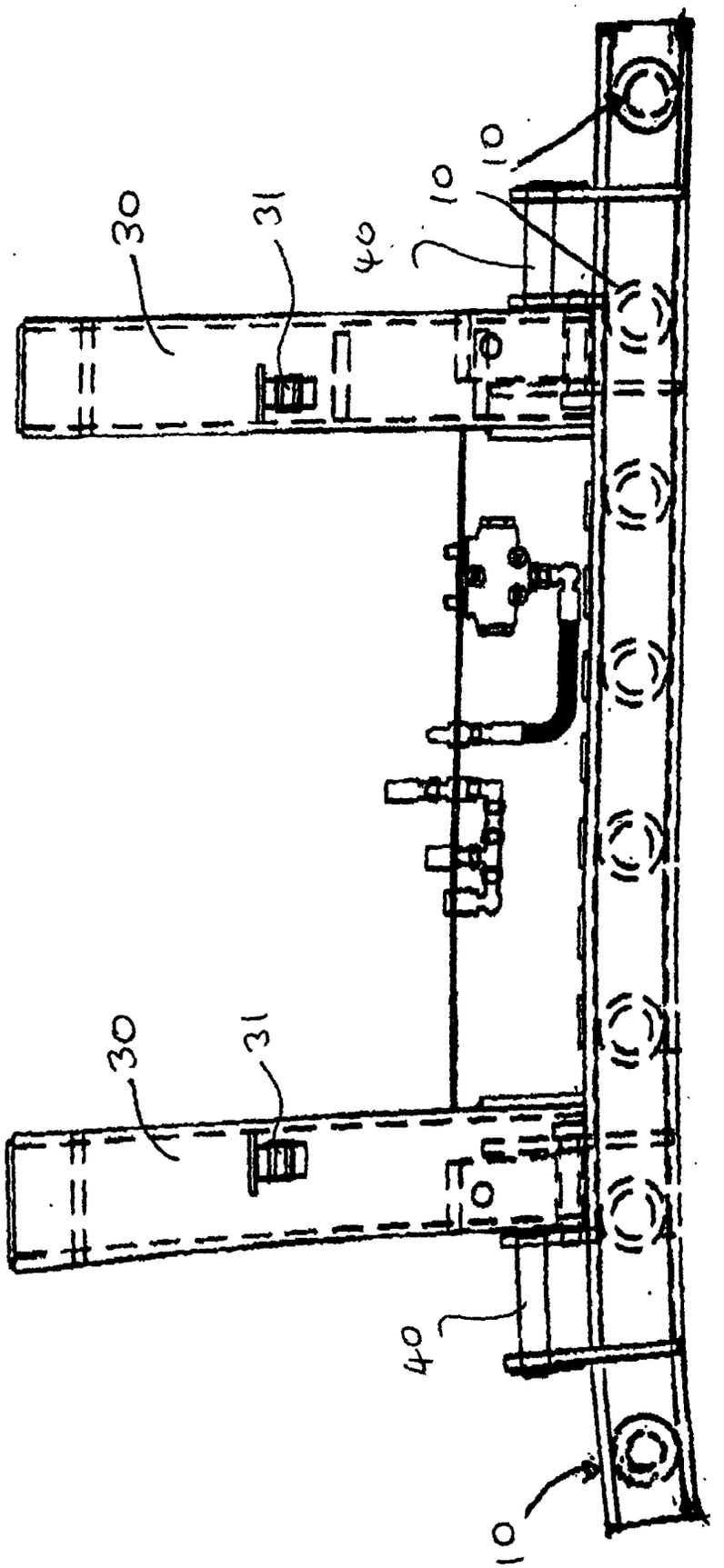


FIG. 5

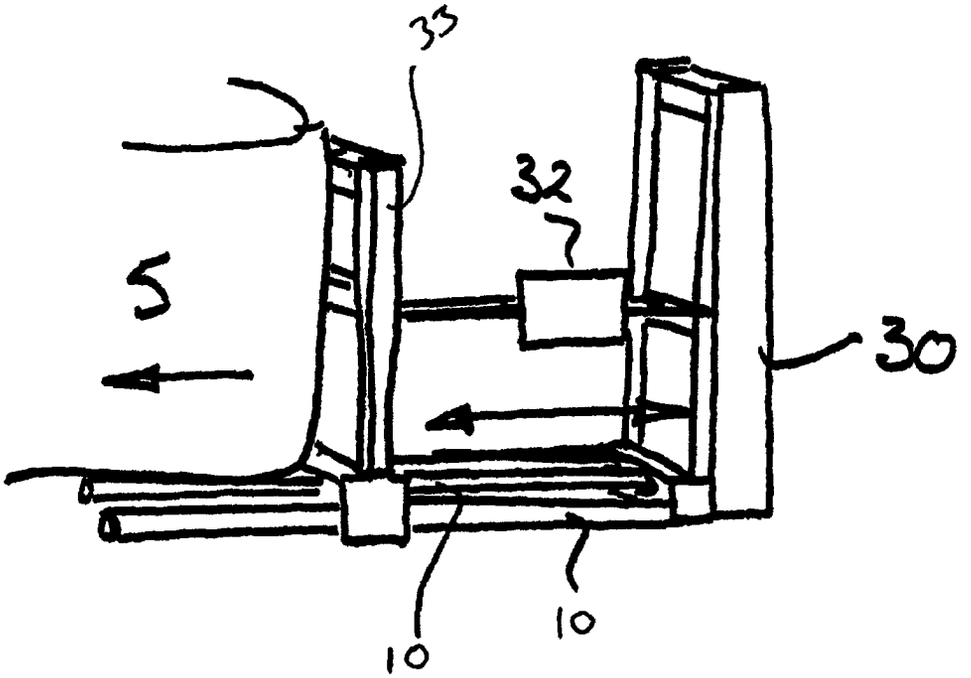


FIG. 6

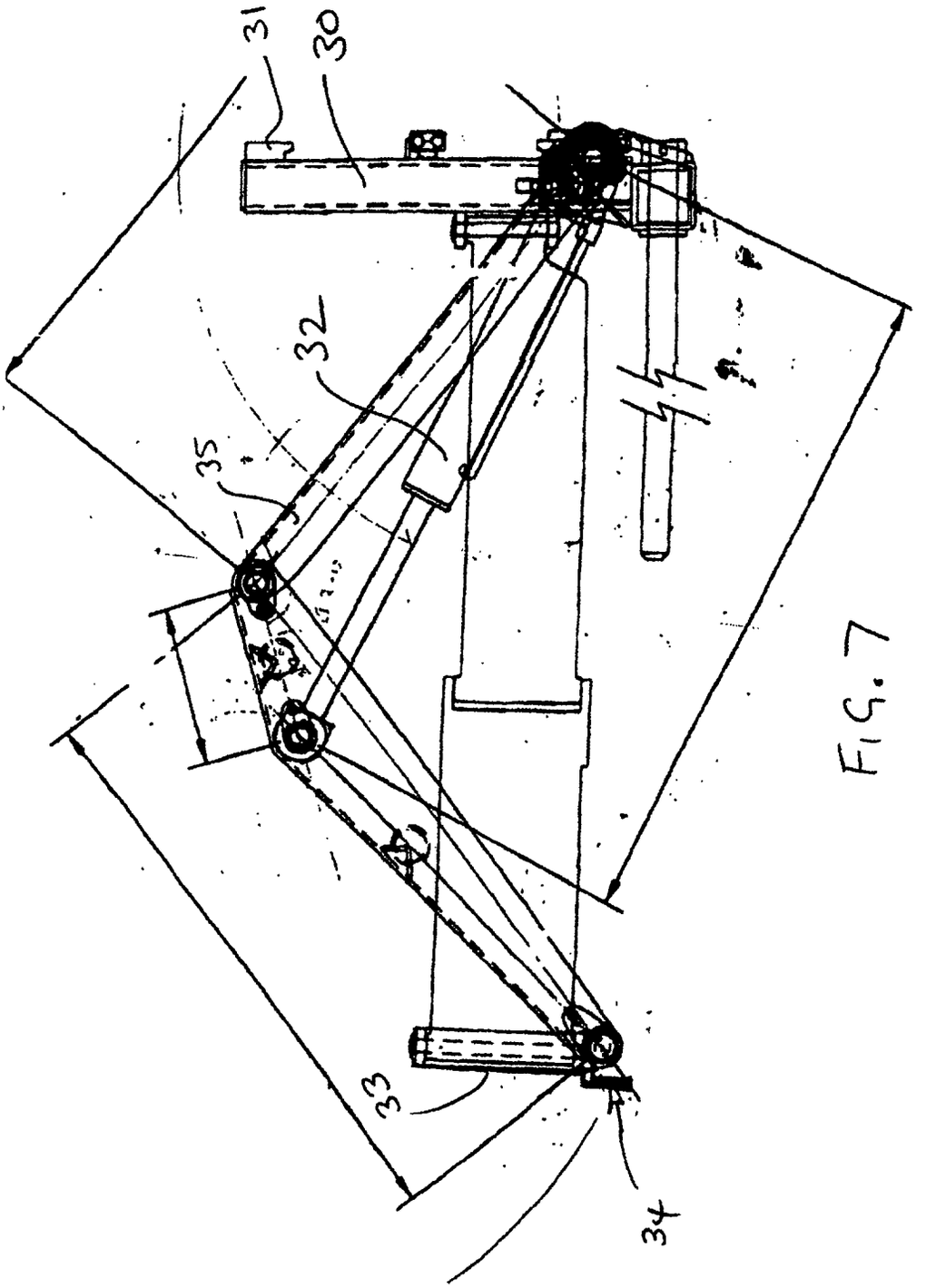


FIG. 7

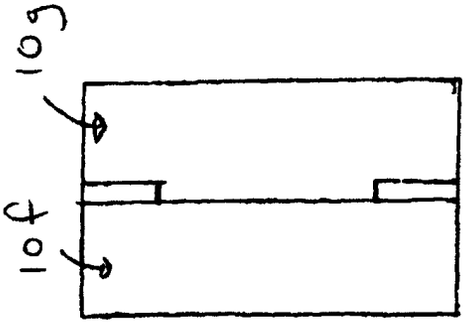


FIG. 8c

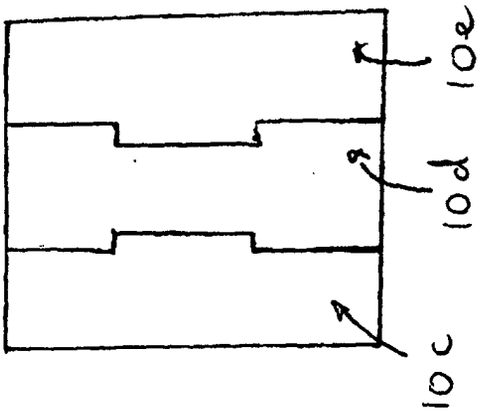


FIG. 8b

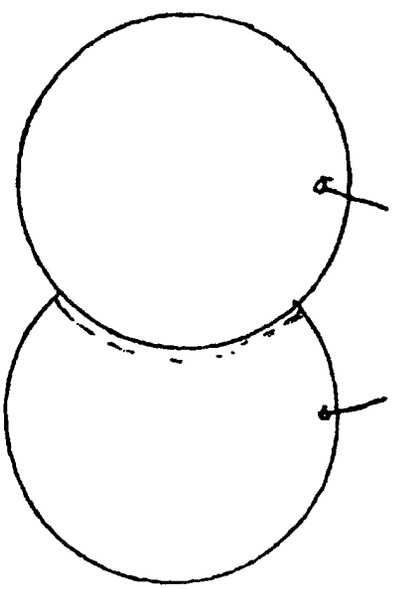


FIG. 8a