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(54) **SMALL-SCALE BLISTER PACKER**

VORRICHTUNG ZUM PRODUZIEREN VON BLISTERPACKUNGEN IN KLEINEM MASSSTAB

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**CA-A- 957 267**
**FR-A- 1 001 640**
**US-A- 3 092 945**
**US-A- 4 068 448**

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## Description

**[0001]** This invention relates to improvements in small-scale blister packers.

**[0002]** Small scale blister packers are used for eg. clinical trials, pack development, stability trials and low volume production, and they are designed to make either a single pack or up to possibly 10,000 packs in a batch. Such packers are also preferably designed for use and relocation where required. The pressing plates are generally adapted to support a number of different pressing tools for different operations such as forming, sealing and cutting, and for different pack shapes and sizes, and at least the upper tool is secured to its pressing plate by a number of bolts, usually near the plate centre. However, the bolting takes time and effort, especially to ensure accurate alignment and levelling of the tools.

**[0003]** A pressing station in accordance with the preamble of appended claim 1 and comprising a releasable attachment means for the lower tool, is known from US 3 092 945 A. Furthermore, US 4 068 448 A discloses a small-scale blister packing apparatus in accordance with the preamble of appended claim 11.

**[0004]** According to one aspect of the present invention, there is provided a pressing station assembly for a small-scale blister packing apparatus comprising upper and lower pressing plates securely supporting upper and lower tools respectively, the upper pressing plate being moveable between a rest position and a pressing position, characterized in that the upper tool is adapted to be secured to the upper pressing plate using a quick release attachment means able to move the upper tool in the rest position directly between an open tool changing position and a closed tool -secured position. The quick release attachment means allows quick and simple location, securement and release of one or both of the tools. This reduces the time and skill needed to change tools. The tools include dies, platen formers, sealers, cutters, perforators, batch coders, and tools for thermo or cold-forming, etc.

**[0005]** One or both tools may be secured directly to the or each respective pressing plate. Alternatively one or both tools are indirectly secured to the or each respective pressing plate using a tool attachment means or tool holding means or both. An upper tool attachment is preferably moveable between an open position for the location, conjoining or release of a tool or tool holding means therewith, and a closed position which secures the tool or tool holding means to the pressing plate. More preferably, the quick release means operates the movement of the tool attachment means.

**[0006]** The quick release attachment means could be any suitable arrangement or assembly, including a toggle joint, biased switch, ram assembly, solenoid, etc, either manually operated or automatic, which is able to secure the relevant pressing plate to the remaining station assembly under pressure. The quick release operation is preferably a single action, such that the relevant tool or tool attachment or tool holding means is readily available for replacement from the rest position. The securement action of the quick release attachment means is also preferably a single action.

**[0007]** Each tool must be accurately aligned and level for the proper forming, sealing, cutting, perforating, etc. of blister packs. Preferably, the pressing station assembly includes one or more guidance means to provide alignment and levelling of the moveable tool(s) when secured to the pressing plate(s). The guidance means may also help support the secured tool(s) during pressing. The guidance means may be one or more pins, posts, etc. with complementary fitting slots, apertures, depressions, etc., in the pressing plates(s), tool holding or tool attachment means.

**[0008]** The, if any, pressing plate not having a quick release attachment means may only need to locate or secure simply its tool in place for pressing. Any such lower secondary pressing plate may also be independently moveable between a pressing position and a tool-changing position. Preferably, the changing position is out of alignment with the other pressing plate to provide ease of access.

**[0009]** According to the second aspect of the present invention, there is provided a small-scale blister packing apparatus comprising a blister roll supporting apparatus, blister roll guidance means, and characterized by a blister pack pressing station assembly as herein defined.

**[0010]** In the packing apparatus of the present invention, the blister roll supporting apparatus (and hence blister roll) is preferably located wholly or substantially vertically below the pressing station assembly. The packing apparatus need not therefore be significantly bigger than the size of the pressing station assembly and the housing area for the blister roll. This creates a compact apparatus compared with prior apparatus which support the blister roll away from the pressing station.

**[0011]** The blister roll guidance means preferably comprises one or more rollers around which the blister roll material is guided in use, thus avoiding any possibly unsmooth or rough edges which could scratch (and hence ruin) the blister roll material, usually through friction. The blister roll guidance means may include a one-way roll-feeding means to prevent the roll material rewinding when cut or otherwise unsupported.

**[0012]** The packing apparatus of the present invention is also preferably wholly or substantially enclosed during use except for the formed blister pack exit. This reduces or avoids dust or microbes etc. which could affect the packing apparatus and/or packs formed. The packing apparatus may be fully or partly automatic. The upper and/or lower tools may be accessed from any side for changing, most conveniently the side having any external heating and/or air leads.

**[0013]** The packing apparatus of the present inven-

tion is also preferably mobile, e.g supported on one or more wheels. As the invention is intended for small scale use, mobility assists relocatability wherever the invention is needed or required.

**[0014]** According to a third aspect of the present invention, there is provided a method of securing a tool of a pressing station assembly for a small-scale blister packing apparatus to the upper pressing plate wherein the tool is secured to the pressing plate using a quick release attachment means able to move the tool directly between an open tool-changing position and a closed tool-secured position.

**[0015]** Embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings in which:

Fig. 1 is a front view of a small-scale blister packing apparatus of the present invention with blister roll;
Figs. 2a and 2b are side views of the apparatus of Fig. 1 without blister roll with the lower holding means in pressing and tool-changing positions respectively;
Fig. 3 is a diagrammatic perspective view of the upper pressing plate, tool attachment means, and tool in Fig. 1 in an open position; and
Figs. 4a and 4b are schematic side views of the upper, lower and base pressing plates of the apparatus of Fig. 1 in open and closed positions respectively.

**[0016]** Referring to the drawings, Fig. 1 shows a small-scale blister packing apparatus. The apparatus is on casters 2 for rapid and easy movement. The apparatus comprises a pressing station assembly 4 and blister roll housing 6. Within the housing 6 is a blister roll support means 8 supporting a blister roll 10. The blister roll 10 is located vertically beneath the pressing station assembly 4, thereby providing compaction of the overall apparatus compared with prior apparatus.

**[0017]** The roll material 12 is guided from its roll 10 by two guide rollers 14 which form the blister roll guidance means. The material 12 is guided to pass through the pressing station assembly 4. The rollers 14 create a simple and frictionless passage for the material 12 which avoids any edges which could damage the material 12. The upper guide roller 14 could have an aligned and shaped rubber wedge or bar engaging therewith or thereon to act as a one-way feeding means to prevent roll material therebeyond when cut or otherwise not secured rewinding back onto the main roll 10.

**[0018]** The pressing station assembly 4, partly shown in more detail in Fig. 3, comprises upper and lower pressing plates 16, 18. The lower plate 18 is fixed and the upper plate 16 is relatively vertically moveable between rest and pressing positions by means of four corner columns 20 connected to a ram assembly beneath the pressing station assembly 4. the ram assembly is shown in Figs. 4a and 4b and discussed below.

**[0019]** As shown in Figs. 2a and 2b, a lower tool holding means 22 is located on the lower plate 18, with a lower tool 23 (shown in dotted form) inserted therein. The lower tool holding means 22 is slideably mounted between a pressing position in Fig. 2a and a tool-changing position in Fig. 2b. This allows easy access to the lower tool holding means 22 when changing the lower tool 23, as well as distancing the changing operation from any heated upper tool. The lower tool 23 is generally the blister-shaping or shaped die.

**[0020]** The upper tool attachment means is a tool attachment block 26, centrally supported through an elongate column 28 to one end of a toggle joint 32 acting as the quick release attachment means. The top of the column 28 is linked to a toggle handle 30 which is also pivotally secured to the upper pressing plate 16. The toggle handle 30 is adapted to move the attachment block 26 between an open position (as shown in Fig. 3) and a closed position (as shown in Fig. 1) relative to the upper pressing plate 16 through the action of the toggle joint 32.

**[0021]** The tool attachment block 26 has side flanges 34 over which side pieces 36 can slide. Preferably, the sides of the block 26 include one or more stops to assist positive location of the side pieces 36 on the block 26. The side pieces 36 are secured to and form part of an upper tool holding means 38, which holding means 38 holds a tool 40. The upper tool 40 is generally the forming, sealing or cutting tool.

**[0022]** Depending from the upper pressing plate 16 are four posts 42. The posts 42 meet the upper tool holding means 38 when the attachment block 26 is in its closed position and at or near the corners of the holding means 38. The posts 42 thus provide support in use wholly or substantially across the whole of the holding means 38 (in combination with the support from the tool attachment block 26). This can help allow reduction in the size of the ram assembly required for the same degree of pressing, or allow for increased pressure, compared with prior small-scale blister packing apparatus (wherein one or both of the tools or tool attachment means were only supported in their centres).

**[0023]** The posts 42 are preferably tapered at their lower ends and there are complementary conical depressions 43 in the upper surface of the upper tool holding means 38. Thus, the posts 42 can assist and/or provide correct and accurate alignment and levelling of the holding means 38 (and hence upper tool 40) with the lower tool etc.

**[0024]** In use, the upper tool holding means 38 and side pieces 36 are slidingly located onto the tool attachment block 26 in its open position The toggle handle 30 is then moved by the operator in a single action until the block 26 is raised and becomes flush with the lower surface of the pressing plate 16. Simultaneously the four corner posts 42 mate with the depressions 43 in the upper tool holding means 38. The pressing station assembly 4 is now ready for use. Reverse movement of the

toggle handle 30, again as a single action moves the block 26 away from the upper pressing plate 16 and posts 42 to allow rapid removal (by simple sliding action) of the upper tool holding means 38 from the pressing assembly 4 for replacement with a similar upper tool holding means but with a different tool.

**[0025]** The fitting and removal of the upper tool holding means 38 is thus a very fast and simple operation taking seconds, and the new tool or tool holding means can still be accurately aligned using the tapered corner posts 42. This operation is in contrast to the requirement of prior tool holding blocks to be bolted in place using usually four bolts, each requiring exactly the same degree of tightening to ensure the tool is level. With hot tools for thermoforming, holding the tool or tool attachment means whilst the bolts are tightened or loosened can be difficult and a lengthy operation.

**[0026]** Once the tools are located and secured, the blister roll material 12 is fed between the tools and the apparatus is ready for operation. The apparatus has a control panel 44. The parts of the apparatus are fully enclosed by the roll housing 6 and a pressing station assembly hood 46 (having an openable front and/or rear portion for access). The pressed material exits through a slot (not shown) in the hood 46.

**[0027]** Figs. 4a and 4b show the pressing operation. The columns 20 from the upper pressing plate are connected to a base pressing plate 48 within the housing 6. The base plate 48 is moved by a ram assembly 50 beneath the lower pressing plate 18. Lowering the base plate 48 creates the pressing of the upper and lower pressing plates 16, 18 together. To increase the pressing pressure, hydraulically-operated tapering side arms 52 extend inwardly over roll bars 54 on the upper edges on the base plate 48, giving possibly a 6:1 mechanical increase in pressing pressure.

**[0028]** The pressing station assembly of the present invention provides a means for quick and simple release and attachment of tools (which are usually already housed, inserted or secured to their required tool attachment means). The tools are still accurately alignable, and are fully supported across their pressing surface. The blister packing apparatus of the present invention can be fully mobile, and is significantly more compact (compared with prior apparatus). The apparatus may therefore be used, located or relocated with significantly fewer problems.

## Claims

1. A pressing station assembly for a small-scale blister packing apparatus comprising upper and lower pressing plates (16, 18) securely supporting upper and lower tools (40, 23) respectively, the upper pressing plate (16) being moveable between a rest position and a pressing position, characterized in that the upper tool (40) is adapted to be secured to the upper pressing plate (16) using a quick release attachment means (28, 30, 32) able to move the upper tool (40) in the rest position directly between an open tool-changing position and a closed tool-secured position.

2. A pressing station as claimed in Claim 1 wherein one or both tools (40, 23) are secured directly to the or each respective pressing plate (16, 18).

3. A pressing station as claimed in Claim 1 wherein one or both tools (40, 23) are indirectly secured to the or each respective pressing plate (16, 18) using a tool attachment means (26) or a tool holding means (38, 22) or both.

4. A pressing station as claimed in Claim 3 using an upper tool attachment means (26) wherein the upper tool attachment means (26) is moveable between an open position for the location, conjoining or release of a tool (40) or tool holding means (38) therewith, and a closed position which secures the tool (40) or tool holding means (38) to the pressing plate.

5. A pressing station as claimed in Claim 3 or Claim 4 wherein the quick release means (28, 30, 32) operates the movement of the tool attachment means (26).

6. A pressing station as claimed in any one of the preceding claims wherein the quick release attachment operation is a single action.

7. A pressing station as claimed in any one of the preceding Claims wherein the pressing station assembly includes one or more guidance means (42) to provide alignment and levelling of the upper tool (40) when secured to the upper pressing plate (16).

8. A pressing station as claimed in Claim 7 wherein the guidance means comprises one or more pins or posts (42).

9. A pressing station as claimed in any one of the preceding Claims wherein the lower pressing plate (18) is independently moveable between a pressing position and a tool-changing position.

10. A pressing station as claimed in any one of the preceding Claims wherein the pressing station is mobile.

11. A small-scale blister packing apparatus comprising a blister roll supporting apparatus (8), blister roll guidance means (14), and characterized by a blister pack pressing station assembly (4) as defined in any one of Claims 1 to 10.

**12.** A blister packing apparatus as claimed in Claim 11 wherein the blister roll supporting apparatus (8) is wholly or substantially vertically below the pressing station assembly (4).

**13.** A blister packing apparatus as claimed in Claim 11 or Claim 12 wherein the blister roll guidance means comprises one or more rollers (14).

**14.** A blister packing apparatus as claimed in Claim 11, 12 or 13 wherein the apparatus is mobile.

**15.** A pressing station assembly as claimed in any one of Claims 1 to 10 or a blister packing assembly as claimed in any one of Claims 11 to 14 which is wholly or substantially closed during use.

**16.** A method of securing a tool (40) of a pressing station assembly (4) for a small-scale blister packing apparatus to the upper pressing plate (16) wherein the tool (40) is secured to the pressing plate (16) using a quick release attachment means (28, 30, 32) able to move the tool (40) directly between an open tool-changing position and a closed tool-secured position.

**Patentansprüche**

**1.** Eine Druckvorrichtungsanordnung für eine kleine Blisterverpackungsvorrichtung, bestehend aus einer oberen und einer unteren Druckplatte (16, 18), welche das obere bzw. untere Werkzeug (40, 23) fest stützen, wobei die obere Druckplatte (16) zwischen einer Ruheposition und einer Druckposition bewegbar ist, dadurch gekennzeichnet, daß das obere Werkzeug (40) ausgeführt ist, um an der oberen Druckplatte (16) befestigt zu werden, indem ein Schnelltrennbefestigungsmittel (28, 30, 32) verwendet wird, welches das obere Werkzeug (40) in die Ruheposition unmittelbar zwischen einer offenen Werkzeugwechselposition und einer geschlossenen Werkzeug gesicherten Position bewegen kann.

**2.** Druckvorrichtung gemäß Anspruch 1, wobei eines oder beide der Werkzeuge (40, 23) direkt an der oder an jeder entsprechenden Druckplatte (16, 18) befestigt ist/sind.

**3.** Druckvorrichtung gemäß Anspruch 1, wobei eines oder beide der Werkzeuge (40, 23) indirekt an der oder an jeder entsprechenden Druckplatte (16, 18) befestigt ist/sind, indem ein Werkzeugbefestigungsmittel (26) oder ein Werkzeughaltemittel (38, 22) oder beides verwendet wird.

**4.** Druckvorrichtung gemäß Anspruch 3 unter Verwendung eines oberen Werkzeugbefestigungsmittels (26), wobei das obere Werkzeugbefestigungsmittel (26) zwischen einer offenen Position zum Lokalisieren, Verbinden oder Lösen eines Werkzeugs (40) oder eines Werkzeughaltemittels (38) darin und einer geschlossenen Position, welche das Werkzeug (40) oder das Werkzeughaltemittel (38) an der Druckplatte befestigt, bewegbar ist.

**5.** Druckvorrichtung gemäß Anspruch 3 oder Anspruch 4, wobei das Schnelltrennmittel (28, 30, 32) die Bewegung des Werkzeugbefestigungsmittels (26) betätigt.

**6.** Druckvorrichtung gemäß einem der vorhergehenden Ansprüche, wobei die Schnelltrennbefestigungsbetätigung eine einzelne Tätigkeit ist.

**7.** Druckvorrichtung gemäß einem der vorhergehenden Ansprüche, wobei die Druckvorrichtungsanordnung ein oder mehrere Führungsmittel (42) beinhaltet, um dem oberen Werkzeug (40) Ausrichtung und Ausgleichung bereitzustellen, wenn es an der oberen Druckplatte (16) befestigt wird.

**8.** Druckvorrichtung gemäß Anspruch 7, wobei das Führungsmittel einen oder mehrere Stifte oder Stützen (42) beinhaltet.

**9.** Druckvorrichtung gemäß einem der vorhergehenden Ansprüche, wobei die untere Druckplatte (18) unabhängig zwischen einer Druckposition und einer Werkzeugwechselposition bewegbar ist.

**10.** Druckvorrichtung gemäß einem der vorhergehenden Ansprüche, wobei die Druckvorrichtung mobil ist.

**11.** Eine kleine Blisterverpackungsvorrichtung, bestehend aus einer Blisterrollenstützvorrichtung (8), Blisterollenführungsmitteln (14), gekennzeichnet durch eine Blisterverpackungsdruckvorrichtung (4) gemäß einem der Ansprüche 1 bis 10.

**12.** Eine Blisterverpackungsvorrichtung gemäß Anspruch 11, wobei eine Blisterrollenstützvorrichtung (8) vollständig oder im wesentlichen vertikal unter der Druckvorrichtungsanordnung (4) liegt.

**13.** Blisterverpackungsvorrichtung gemäß Anspruch 11 oder Anspruch 12, wobei das Blisterrollenführungsmittel eine oder mehrere Rollen (14) beinhaltet.

**14.** Blisterverpackungsvorrichtung gemäß Anspruch 11, 12 oder 13, wobei die Vorrichtung mobil ist.

**15.** Eine Druckvorrichtungsanordnung gemäß einem der Ansprüche 1 bis 10 oder eine Blisterverpak-

kungsvorrichtung gemäß einem der Ansprüche 11 bis 14, die während sie verwendet wird, vollkommen oder im wesentlichen geschlossen ist.

**16.** Ein Verfahren zum Befestigen eines Werkzeugs (40) einer Druckvorrichtungsanordnung 4 für eine kleine Blisterverpackungsvorrichtung an der oberen Druckplatte (16), wobei das Werkzeug (40) mittels eines Schnelltrennbefestigungsmittels (28, 30, 32), welches das Werkzeug (40) direkt zwischen einer offenen Werkzeugwechselposition und einer geschlossenen Werkzeug gesicherten Position bewegen kann, an der Druckplatte (16) befestigt wird.

**Revendications**

**1.** Un assemblage de poste de pressage destiné à un appareil pour emballage-coque de dimensions réduites comprenant des plateaux de presse supérieur et inférieur (16, 18) soutenant par fixation des moules supérieur et inférieur (40, 23) respectivement, le plateau de presse supérieur (16) pouvant être déplacé entre une position de repos et une position de pressage, caractérisé en ce que le moule supérieur (40) est adapté pour être fixé au plateau de presse supérieur (16) à l'aide d'un moyen d'assujettissement à libération rapide (28, 30, 32) pouvant déplacer le moule supérieur (40) dans la position de repos directement entre une position ouverte de changement de moule et une position fermée de fixation de moule.

**2.** Un poste de pressage tel que revendiqué dans la revendication 1 dans lequel un ou les deux moules (40, 23) sont directement fixés au plateau ou à chaque plateau de presse respectif (16, 18).

**3.** Un poste de pressage tel que revendiqué dans la revendication 1 dans lequel un ou les deux moules (40, 23) sont indirectement fixés au plateau ou à chaque plateau de presse respectif (16, 18) à l'aide d'un moyen d'assujettissement de moule (26) ou d'un moyen de retenue de moule (38, 22) ou des deux.

**4.** Un poste de pressage tel que revendiqué dans la revendication 3 utilisant un moyen d'assujettissement de moule supérieur (26) dans lequel le moyen d'assujettissement de moule supérieur (26) peut être déplacé entre une position ouverte pour positionner, associer ou libérer un moule (40) ou un moyen de retenue de moule (38) accompagnant celui-ci, et une position fermée qui fixe le moule (40) ou le moyen de retenue de moule (38) au plateau de presse.

**5.** Un poste de pressage tel que revendiqué dans la revendication 3 ou la revendication 4 dans lequel le moyen à libération rapide (28, 30, 32) commande le déplacement du moyen d'assujettissement de moule (26).

**6.** Un poste de pressage tel que revendiqué dans une quelconque des revendications précédentes dans lequel l'opération d'assujettissement à libération rapide est une action unique.

**7.** Un poste de pressage tel que revendiqué dans une quelconque des revendications précédentes dans lequel l'assemblage de poste de pressage comporte au moins un moyen de guidage (42) pour aligner et mettre le moule supérieur (40) à niveau lorsqu'il est fixé au plateau de presse supérieur (16).

**8.** Un poste de pressage tel que revendiqué dans la revendication 7 dans lequel le moyen de guidage comprend au moins une tige ou un montant (42).

**9.** Un poste de pressage tel que revendiqué dans une quelconque des revendications précédentes dans lequel le plateau de presse inférieur (18) peut être déplacé de façon indépendante entre une position de pressage et une position de changement de moule.

**10.** Un poste de pressage tel que revendiqué dans une quelconque des revendications précédentes dans lequel le poste de pressage est mobile.

**11.** Un appareil pour emballage-coque de dimensions réduites comprenant un appareil de support de rouleaux à coques (8), un moyen de guidage de rouleaux à coques (14), et caractérisé par un assemblage de poste de pressage pour emballage-coque (4) tel que défini dans une quelconque des revendications 1 à 10.

**12.** Un appareil pour emballage-coque tel que revendiqué dans la revendication 11 dans lequel l'appareil de support de rouleaux à coques (8) est entièrement ou en grande partie à la verticale en dessous de l'assemblage de poste de pressage (4).

**13.** Un appareil pour emballage-coque tel que revendiqué dans la revendication 11 ou la revendication 12 dans lequel le moyen de guidage de rouleaux à coques comprend au moins un rouleau (14).

**14.** Un appareil pour emballage-coque tel que revendiqué dans la revendication 11, 12 ou 13 dans lequel l'appareil est mobile.

**15.** Un assemblage de poste de pressage tel que revendiqué dans une quelconque des revendications 1 à 10 ou un assemblage pour emballage-coque tel

que revendiqué dans une quelconque des revendications 11 à 14, lequel est entièrement ou en grande partie fermé au cours de l'utilisation.

**16.** Un procédé de fixation d'un moule (40) d'un assemblage de poste de pressage (4) destiné à un appareil pour emballage-coque de dimensions réduites au plateau de presse supérieur (16) dans lequel le moule (40) est fixé au plateau de presse (16) à l'aide d'un moyen d'assujettissement à libération rapide (28, 30, 32) pouvant déplacer le moule (40) directement entre une position ouverte de changement de moule et une position fermée de fixation de moule.

Fig 1

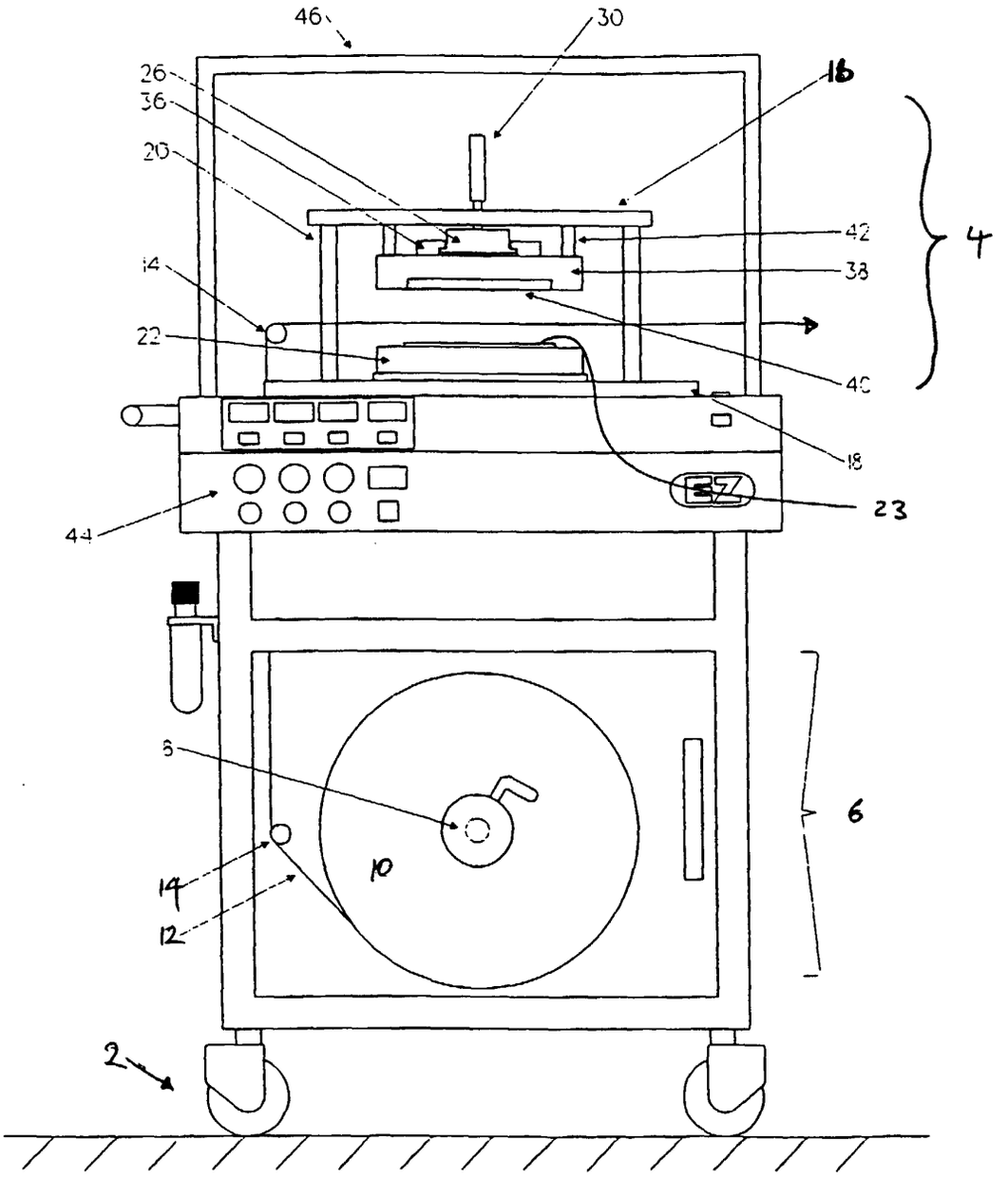


Fig 2a

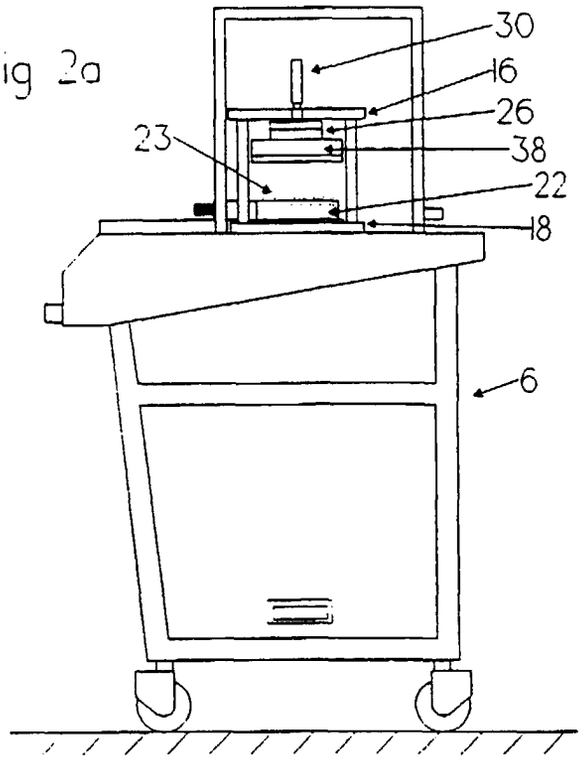
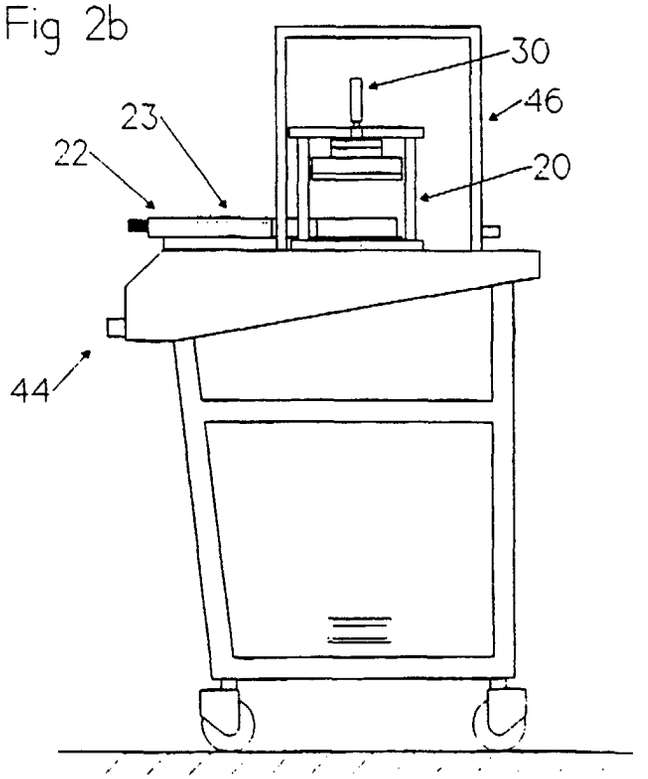



Fig 2b



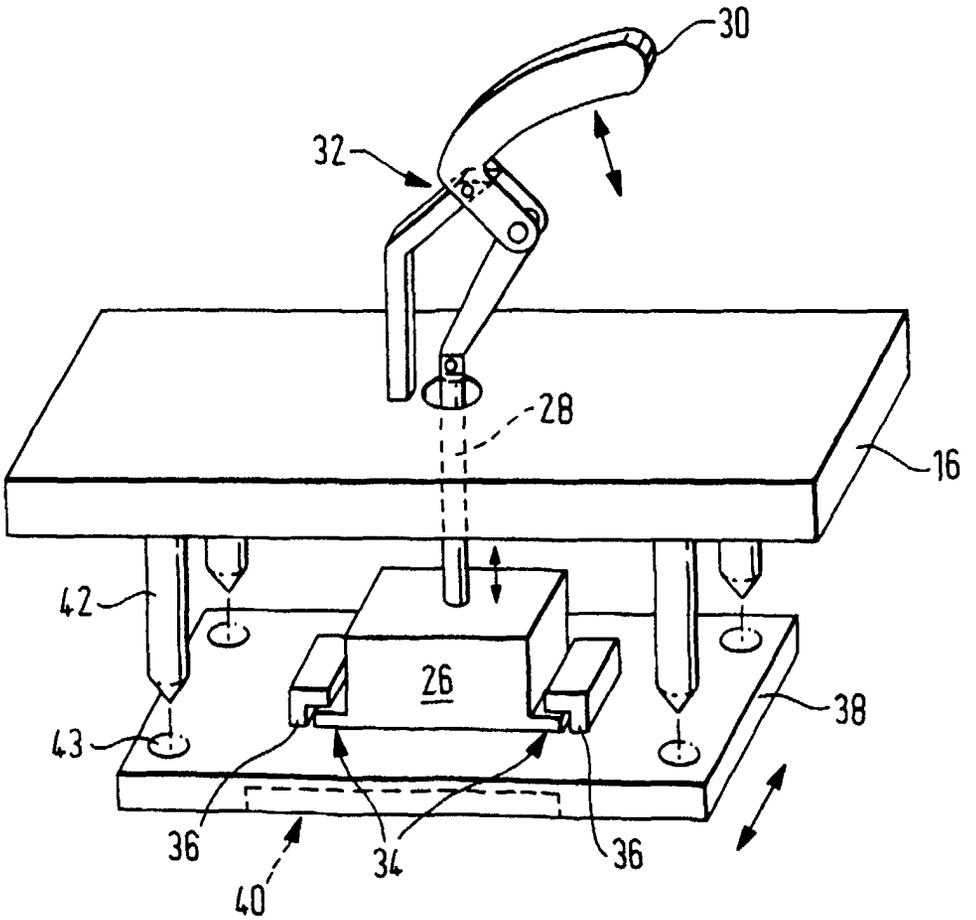



FIG. 3

Fig 4a

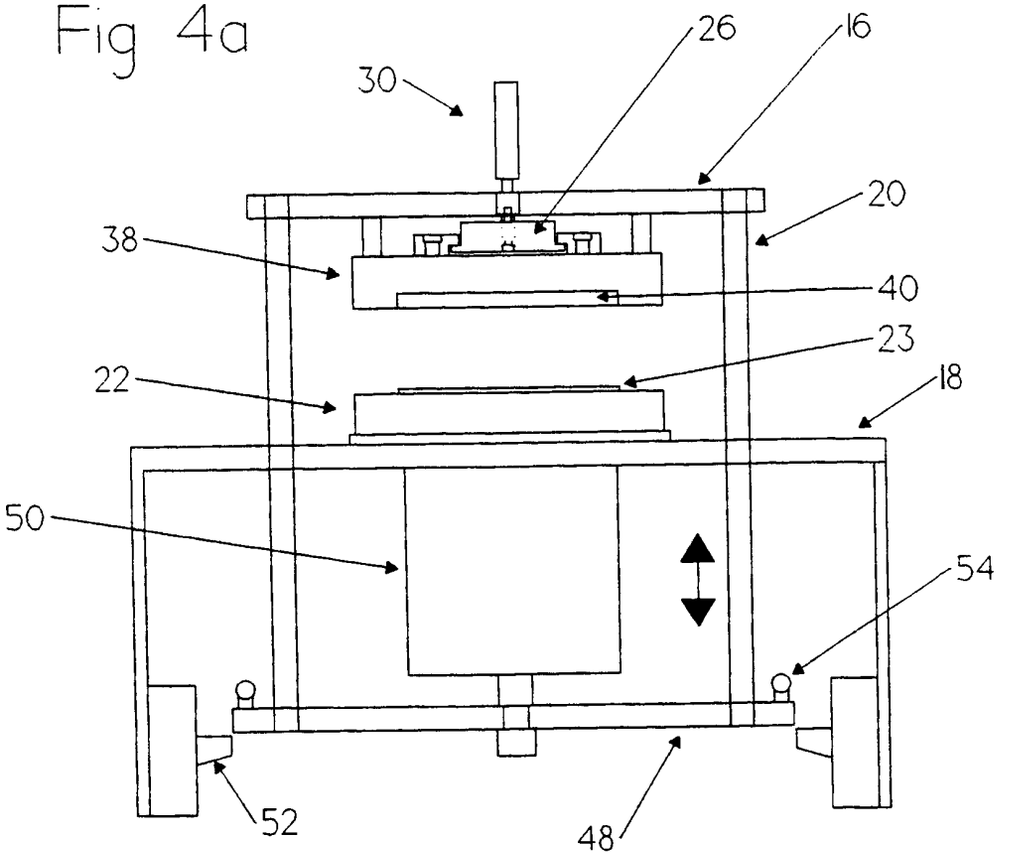



Fig 4b

