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(54) APPARATUS AND METHOD FOR INJECTING INSULATION MATERIAL

VORRICHTUNG UND VERFAHREN ZUM EINSPRITZEN VON ISOLIERMATERIAL

APPAREIL ET PROCÉDÉ D'INJECTION DE MATÉRIAU D'ISOLATION

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US-A- 4 545 948

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Description

Technical Field of the Invention

[0001] The present invention relates to an apparatus for injecting a prepared insulation material mixture in liquid phase into at least a cavity of a constructional block, and also a method for injecting prepared insulation material mixture with said apparatus.

Background of the Invention

[0002] In order to improve thermal insulation properties of a building, also by reducing total weight of the same, use of insulation materials together with the constructional blocks/bricks are highly recommended. Nowadays, a variety of constructional blocks are present on the market which already include insulation material fitted to a part of said block. An example of said constructional blocks is disclosed by GB 2088923 A, where a constructional block comprising a concrete body with a layer of insulating material attached to one of the oblong major faces of the body is explained. The juxtaposed surfaces of the concrete body and the polystyrene layer may be interlocked mechanically by means of dovetail section tongues and grooves extending parallel to each other through the entire length of the block.

[0003] As another example, US2006101756 A1 discloses an insulated masonry block and a method for producing such an insulated masonry block. Wherein, a pre-formed, high-strength foam core, which is the insulating material, sandwiches and joins two inner walls of the insulated masonry block together. A method for producing such an insulated masonry block comprises: placing a pre-formed insulating foam core in the middle of a standard block form; filling it with concrete, cinder, or any other known building compound aggregate, and allowing it to cure.

[0004] US 4 545 948 A discloses an injection apparatus in accordance with the preamble of claim 1 and a method for injecting a liquid or a semi-liquid material in accordance with the preamble of claim 10, more particularly it discloses a method for adjusting blocks in the height which comprises laying over the top sides of the blocks an amount of a material which is hardenable and bindable thereon, with a height which is higher than the difference between said predetermined height and the actual height of the block under consideration, and levelling thereafter said material over said block sides before hardening thereof until the total block height formed by the sum of said block height and said material height, substantially corresponds to said predetermined height.

[0005] WO 2016/156971 A1 relates to a system for injecting a low-density aqueous mineral foam into a cell of a construction block, comprising: a means for storing the aqueous mineral foam; a means for adjusting the flow of the aqueous mineral foam from the storage means towards the outside of the storage means, said adjustment

means being movable between a first operating state in which the flow of the aqueous mineral foam is allowed and a second operating state in which the flow of the aqueous mineral foam is interrupted; a control means arranged to control the movement of the adjustment means so as to collect a volume of aqueous mineral foam from the storage means; and a means for conveying the aqueous mineral foam, arranged between the storage means and the cell of the construction element, the conveying means being sized so as to grant the aqueous mineral foam an estimated maximum shear velocity of 55 s⁻¹, preferably 30 s⁻¹, and more preferably 5 s⁻¹.

[0006] CN 104 441 467 A relates to a gas filling machine for building block injection molding. The gas filling machine comprises a rack, the rack is provided with a gas filling device which is driven by a power device to move up and down, and the gas filling device comprises a building block hole interior gas filling device and a building block hole upper surface gas filling device. The gas filling machine for building block injection molding is provided with the interior gas filling device and the upper surface gas filling device, polyphenyl granules are expanded, adhered and cured due to influence of steam, so as to form integral polyphenyl blocks matching exactly with walls of building blocks, the interior gas filling device can be used for filling high-temperature steam into the polyphenyl granules of the building block holes, so that the polyphenyl granules in the middle and at the bottom of the building block holes are well expanded, adhered and cured, the upper surfaces of the polyphenyl granules of the building block holes can be filled with gas and pressurized through the upper surface gas filling device, so that the upper-layer polyphenyl granules of the building block holes can be well expanded, adhered and cured, the forming plane is smooth, and the heat-preservation and insulation effects of building blocks can be effectively enhanced.

[0007] Known insulation materials to be applied on constructional blocks are pre-formed, solid materials that are shaped as to be engaged with the relevant part of a block. In such pre-formed insulation materials, difficulties of sizing the elements and engaging the insulation materials to blocks are encountered. Also, use of resins for fixating the insulation materials to the blocks is needed.

[0008] When insulation techniques of the present construction industry are investigated, it is apparent that there is a need for a developed technology about an apparatus for injecting a prepared insulation material mixture into at least a cavity of a constructional block/brick and also a method for injecting the same by an injection apparatus according to the present invention. The injection apparatus according to the present invention is easy to use and reduces construction costs via saving workmanship and time. By using said injection apparatus according to the disclosed injection method, abovementioned shortcomings of the prior art are overcome.

Objects of the Invention

[0009] Primary object of the present invention is to overcome the abovementioned shortcomings of the prior art.

[0010] Another object of the present invention is provision of an apparatus for injecting a prepared insulation material paste into cavity/cavities of a constructional block.

[0011] Another object of the present invention is provision of an apparatus for injecting an insulation material paste by reducing construction costs via saving workmanship and time.

[0012] Another object of the present invention is provision of a method for injecting a prepared insulation material paste into cavity/cavities of a constructional block by using injection apparatus according to the present invention.

[0013] Another object of the present invention is to provide an injection apparatus and a method for operating said injection apparatus according to the present invention where the adherence of the insulation material to the cavity of the construction block is improved.

Summary of the Invention

[0014] The present invention proposes an injection apparatus comprising the features of independent claim 1. embodiments of said invention, said apparatus may further comprise at least one inlet pipe in the form of an opening which is positioned on the top portion of the cover, a closing tip fixed to lower end of a connection rod for covering the opening of the outlet pipe when said connection rod is in the closed position, a spring that is worn on at least one connection rod, a spring stopper fixed on the connection rod for limiting a lower position of said spring on said connection rod and a nut that is fixed on an upper end of at least one connection rod.

[0015] The present invention also discloses a method in accordance with claim 10 for injecting a liquid or semi-liquid material, preferably insulation material.

Brief Description of the Figures

[0016] The figures, whose brief explanations are herewith provided, are solely intended for providing a better understanding of the present invention and are as such not intended to define the scope of protection or the context in which said scope is to be interpreted in the absence of the description.

Figure 1 demonstrates a perspective view of the injection apparatus according to the present invention, wherein the outlet pipes are in open position.

Figure 2 demonstrates a side view of the injection apparatus shown in Fig. 1.

Figure 3 demonstrates a transversal cross-section view of the injection apparatus shown in Fig. 1.

Detailed Description of the Invention

[0017] The present invention relates to an apparatus (10) for injecting a prepared material in liquid or semi-liquid phase on a predetermined area and also a method for operating said injection apparatus (10). Disclosed injection apparatus (10) comprises a receptacle (1) for receiving a material in liquid or semi-liquid phase, a cover (4) positioned on top portion of the receptacle (1), at least one outlet pipe (5) in the form of an opening, at least one connection rod (7) correlated to said cover (4) and elongated through the outlet pipe (5) for bringing relative outlet pipe (5) in opened or closed position, where the prepared material in said receptacle (1) is respectively allowed to be injected or not.

[0018] Referring now to the figures outlined above, a preferred embodiment of the present invention proposes an injection apparatus (10), designed for injecting prepared insulation material into one or more cavities of at least one constructional block. Here, the receptacle (1) comprises four lateral surfaces and a base surface which together form an inner volume where optionally a liquid or semi-liquid material, preferably insulation material, is placed. Also one or more outlet pipes (5) are placed on at least a surface of the receptacle (1) in the form of an opening, for allowing the liquid or semi-liquid insulation material that was placed into said receptacle to be injected/poured into the cavities of the constructional block. Said outlet pipes (5) are positioned preferably on bottom surface of said receptacle (1). For operating the apparatus (10), one or more connection rods (7) are designed to be placed into the inner volume of the receptacle (1). The number of the connection rods (7) is preferably equal to the number of the outlet pipes (5) since one end of each connection rods (7) are elongated through the outlet pipes (5) and aimed to bring relative outlet pipes (5) in opened or closed positions for allowing the insulation material present in said receptacle (1) respectively to be injected or not. The other ends of said connection rods (7) are attached to a cover (4), which is positioned on an open upper surface of the receptacle (1) in a conventional manner.

[0019] According to a preferred embodiment of the present invention, each connection rod (7) includes an upper end (7a), attached to said cover (4) and also a lower end (7b), elongated through the outlet pipe (5) and aimed to bring relative outlet pipe (5) into opened or closed positions. Said lower end (7b) optionally comprises a closing tip (2) for completely covering the opening of the outlet pipe (5) when it is in closed position. Said closing tip (2) is preferably manufactured from polymeric material which has a high compression strength and shock absorbing capacity respectively for providing a long service-life and for preventing occurrence of noise when the closing tip (2) is come into contacted with an outer wall of the relative outlet pipe (5) for bringing the same to a closed position.

[0020] Referring now to Fig. 3, the cover (4) includes

a plurality of holes where each hole is constituted for one connection rod (7) that is located into the inner volume of the receptacle (1) for arranging the opened or closed positions of the outlet pipes (5). Accordingly, the number of connection rods (7) is preferably equal to the number of the holes on the cover (4) and also to the number of outlet pipes (5). In this configuration, the upper end (7a) of each connection rod (7) is passed through one hole of the cover (4) and then, a nut (8) is fixed onto the upper end (7a) of said connection rod (7) as to fasten said upper end (7a) of the connection rod (7) to an upper portion of the cover (4) such that dislocation of said upper end (7a) from the hole is prevented and also, guidance of the connection rod (7) by the cover hole is supplied.

[0021] According to a preferred embodiment of the present invention a spring (3), preferably a compression spring, is put on the connection rod (7), where the spring (3) is favorably located close to the upper end (7a) of the connection rod (7) as to be adjacent to the cover (4). Furthermore, a spring stopper (9) is fixed on the body of the connection rod (7) for delimiting a lower position of said spring (3) on said connection rod (7). Said spring stopper (9) favorably has a shape of a ring that surrounds the outer wall of the connection rod (7) and also the spring is positioned on said connection rod (7) between the cover (4) and the spring stopper (9) as shown on figure 2.

[0022] Said injection apparatus also includes at least one inlet pipe (6) which is preferably placed on the cover (4), in the form of an opening. Said inlet pipe (6) is used for pouring a readily prepared insulation material into the inner volume of said receptacle (1).

[0023] A method for operating above disclosed injection apparatus (10) and for injecting a liquid or semi-liquid material comprises below disclosed method steps:

- i) pouring a predetermined amount of a liquid or semi-liquid material, preferably insulation material, into a receptacle (1),
- ii) pulling up one or more connection rods (7) till bringing the outlet pipes (5) in an opened position,
- iii) injecting a predetermined amount of said material,
- iv) pushing down said connection rods (7) towards relative outlet pipes (5) up to completely cover openings of said outlet pipes (5).

[0024] According to the present invention, one or more arms fixed to the cover (4) are actuated by a motor or a compressor system, where the movement of the arms enables the cover (4) to be moved in vertical direction. Figure 3, demonstrates the cross-sectional view of the injection apparatus (10) wherein the outlet pipes (5) are in open position. For bringing said outlet pipes (5) into closed position, said arms are moved and in conjunction with the movement of the arms, the cover (4) is pushed down towards the base of the receptacle (1). This downward movement of the cover (4) causes the connection rods (7) and their lower ends (7b) and optionally the closing tips (2) to be moved towards the relative outlet pipes

(5). When the lower ends (7b) and optionally the closing tips (2) are contacted to upper surfaces of the outlet pipes (5) as to completely cover their openings, the downward movement of the cover (4) starts to exert pressure on the springs (3) together with the lower ends (7b) of the connection rods (7) and, if present the closing tips (2). In that position the outlet pipes (5) are completely closed and injection of the insulation material, which was already placed into said receptacle (1), is interrupted. Now, a predetermined amount of a liquid or semi-liquid material, preferably insulation material to be injected out by the injection apparatus (10), may optionally be poured into the volume of the receptacle (1). Said pouring operation is preferably executed through at least one inlet pipe (6). For bringing the injection apparatus (10) into an opened position as demonstrated in figure 3, said arms are actuated and moved by the motor or the compressor system and in conjunction with this movement of said arms, the cover (4) is moved in upwards direction from the base of the receptacle (1). This upward movement of the cover (4) first causes the exerted pressure on the springs (3) to be reduced and when the springs (3) are reverted back to their unloaded position, the still-continuing upward movement of the cover (4) causes the upper surface of said cover (4) to contact the nuts (8) and therefore to lift up the connection rods (7) also as to pull up their lower ends (7b) and optionally the closing tips (2), and thus releasing the openings of the outlet pipes (5). After the their lower ends (7b) and optionally the closing tips (2) are removed from the outlet pipes (5), injection of the liquid or semi-liquid material, preferably the insulation material, is initiated, in other words the outlet pipes (5) are brought in opened position.

[0025] According to an embodiment not forming part of the present invention, the cover (4) is fastened on top portion of the receptacle (1) and the arm which is actuated by a motor or a compressor system is connected directly to the connection rod (7), or preferably to upper end (7a) thereof or optionally to the nut (8) affixed directly to the upper end (7a) of said connection rod (7). In closed position of the related outlet pipe (5), the lower end (7b) of the connection rod (7) or optionally the closing tip (2) is contacted to upper surfaces of the outlet pipe (5) as to completely cover its opening and also the spring (3) is in a released position between the spring stopper (9) and the bottom surface of the cover (4). For bringing said outlet pipe (5) into opened position, the arm is actuated and moved and in conjunction with the movement of the arm, the connection rod (7), which was associated with the actuated arm, is lifted up through the hole of the cover (4). This upward movement of the connection rod (7) causes its lower end (7b) and optionally the closing tip (2) to be moved as to release the opening of the outlet pipe (5). On the other hand, said upward movement of the connection rod (7) also causes pressure to be exerted on the spring (3) by compressing the same between the spring stopper (9) and the bottom surface of the cover (4). In that position, injection of the liquid or semi-liquid

material, preferably the insulation material, is initiated, and in other words the outlet pipe (5) is come into an opened position. After the motion force applied on the arm is removed, the compressed spring pushes the connection rod (7) down by also pushing the spring stopper (9) towards the outlet pipe (5). Accordingly, the lower end (7b) of the connection rod (7) or optionally the closing tip (2) is contacted to the upper surface of the outlet pipe (5) as to completely cover its opening and, the downward movement of the connection rod (7) together with the spring stopper (9) causes the spring (3) to be released where the outlet pipe (5) is in a closed position and injection of the insulation material, that was already placed into said receptacle, is interrupted. According to another preferred embodiment of the invention disclosed here, the injection apparatus (10) comprises a plurality of outlet pipes (5) according to demand of the user and also the number of the connection rods (7) are equal to the number of the outlet pipes (5) and the number of the arms, each of which are connected directly or indirectly to one connection rod (7).

[0026] According to an embodiment of the present invention, said injection apparatus (10) comprises at least one level sensor for detecting level of the material injected into a cavity of a constructional block. When the level of said material in said cavity is reached to a predetermined level, the sensor actuates moving parts of the injection apparatus (10) and causes the relative outlet pipe to be brought into its closed position. Preferably, each level sensor is positioned on bottom surface of the base of said receptacle (1), preferably next to each outlet pipe (5), for detecting height of the injected material from an outlet pipe (5) into related cavity of the constructional block. Accordingly, when the level of the injected material in related cavity is reached to a predetermined height, sensor of said outlet pipe (5) stimulates the movement of the related arm, which is directly connected to the related connection rod (7) and brings the outlet pipe (5) of said cavity in opened/closed position.

Claims

1. An injection apparatus (10) comprising

a receptacle (1) for receiving a material in liquid or semi-liquid phase,
 a cover (4) positioned on top portion of the receptacle (1),
 at least one outlet pipe (5) in the form of an opening,
 at least one connection rod (7) which is correlated to said cover (4) and elongated through the outlet pipes (5) for bringing relative outlet pipe (5) in opened or closed position, **characterised in that;**
 said cover is affixed to one or more arms where movement of said arm enables the cover (4) and

the connection rods (7) to be moved together, and said one or more arms are actuated by a motor or a compressor system where the movement of the arms enables the cover (4) to be moved in vertical direction.

2. The injection apparatus (10) according to claim 1, wherein said cover (4) includes a plurality of holes where each hole is constituted for receiving one connection rod (7).
3. The injection apparatus (10) according to any one of the preceding claims, wherein said at least one connection rod (7) comprises a closing tip (2) fixed to its lower end (7b) for covering the opening of the outlet pipe (5) when said connection rod (7) is in the closed position.
4. The injection apparatus (10) according to any one of the preceding claims, wherein a spring (3) is put on at least one connection rod (7), preferably located close to the upper end (7a) of the connection rod (7) as to be adjacent to the cover (4) .
5. The injection apparatus (10) according to claim 4, comprising a spring stopper (9) fixed on the connection rod (7) for limiting a lower position of said spring (3) on said connection rod (7).
6. The injection apparatus (10) according to claim 2, wherein a nut (8) is fixed on an upper end (7a) of at least one connection rod (7), as to hold said upper end (7a) of the connection rod (7) to an upper portion of the cover (4).
7. The injection apparatus (10) according to any one of the preceding claims, wherein the receptacle (1) includes at least one outlet pipe (5), positioned preferably on bottom surface of said receptacle (1).
8. The injection apparatus (10) according to any one of the preceding claims, further comprising at least one inlet pipe (6) in the form of an opening, preferably positioned on the cover (4).
9. The injection apparatus (10) according to any one of the preceding claims, further comprising at least one level sensor, preferably positioned on bottom surface of base of said receptacle (1), for detecting height of the material injected from an outlet pipe (5) into related cavity of the constructional block.
10. A method for injecting a liquid or semi-liquid material comprising the steps of:
 - i) pouring a predetermined amount of a liquid or semi-liquid material into a receptacle (1),
 - ii) pulling up one or more connection rods (7) till

bringing the outlet pipes (5) in an opened position,

iii) injecting a predetermined amount of said material through one or more outlet pipes (5),

iv) pushing down said connection rods (7) towards relative outlet pipes (5) up to completely cover openings of said outlet pipes (5)

characterised in that; the connection rods (7) are correlated to a cover (4) being positioned on top portion of the receptacle (1), said cover is affixed to one or more arms, wherein said one or more arms are actuated by a motor or a compressor system and where the movement of the arms enables the cover (4) to be moved in vertical direction and the movement of the connection rods (7) are provided by the movement of said cover (4).

11. The method according to claim 10, wherein at least one connection rod (7) comprises a lower end (7b) and preferably a closing tip (2) fixed to said lower end (7b) of the connection rod (7), for covering the opening of the outlet pipe (5) when said connection rod (7) is in the closed position.

12. The method according to claim 10 or 11, wherein said liquid or semi-liquid material, preferably insulation material, is poured into an inner volume of the receptacle (1) through at least one inlet pipe (6).

Patentansprüche

1. Einspritzvorrichtung (10) mit

einem Gefäß (1) zur Aufnahme eines Materials in flüssiger oder halbflüssiger Phase, einer Abdeckung (4), die auf dem oberen Teil des Gefäßes (1) angeordnet ist, mindestens einem Auslassrohr (5) in Form einer Öffnung, mindestens einer Verbindungsstange (7), die der Abdeckung (4) zugeordnet ist und sich durch die Auslassrohre (5) erstreckt, um das jeweilige Auslassrohr (5) in eine geöffnete oder geschlossene Position zu bringen,

dadurch gekennzeichnet, dass

die Abdeckung an einem oder mehreren Armen befestigt ist, wobei die Bewegung des Arms der Abdeckung (4) und den Verbindungsstangen (7) ermöglicht, sich zusammen zu bewegen, und

der eine Arm oder die mehreren Arme durch einen Motor oder eine Kompressoranlage betrieben werden, wobei die Bewegung der Arme die Bewegung der Abdeckung (4) ermöglicht sich in vertikaler Richtung zu bewegen.

2. Einspritzvorrichtung (10) nach Anspruch 1, wobei

die Abdeckung (4) eine Vielzahl von Löchern aufweist, wobei jedes Loch zum Aufnehmen einer Verbindungsstange (7) ausgebildet ist.

3. Einspritzvorrichtung (10) nach einem der vorhergehenden Ansprüche, wobei die mindestens eine Verbindungsstange (7) eine an ihrem unteren Ende (7b) befestigte Verschluss Spitze (2) zum Abdecken der Öffnung des Auslassrohrs (5) aufweist, wenn sich die Verbindungsstange (7) in der geschlossenen Position befindet.

4. Einspritzvorrichtung (10) nach einem der vorhergehenden Ansprüche, wobei eine Feder (3) auf mindestens eine Verbindungsstange (7) aufgesetzt ist, die vorzugsweise nahe dem oberen Ende (7a) der Verbindungsstange (7) angeordnet ist, so dass sie an die Abdeckung (4) angrenzt.

5. Einspritzvorrichtung (10) nach Anspruch 4 mit einem an der Verbindungsstange (7) befestigten Federanschlag (9) zum Begrenzen einer unteren Position der Feder (3) an der Verbindungsstange (7).

6. Einspritzvorrichtung (10) nach Anspruch 2, wobei eine Mutter (8) an einem oberen Ende (7a) von mindestens einer Verbindungsstange (7) befestigt ist, um das obere Ende (7a) der Verbindungsstange (7) an einem oberen Abschnitt der Abdeckung (4) zu halten.

7. Einspritzvorrichtung (10) nach einem der vorhergehenden Ansprüche, wobei das Gefäß (1) mindestens ein Auslassrohr (5) aufweist, das vorzugsweise an der Bodenfläche des Gefäßes (1) angeordnet ist.

8. Einspritzvorrichtung (10) nach einem der vorangehenden Ansprüche, mit ferner mindestens einem Einlassrohr (6) in Form einer Öffnung, das vorzugsweise auf der Abdeckung (4) angeordnet ist.

9. Einspritzvorrichtung (10) nach einem der vorangehenden Ansprüche, mit ferner mindestens einen Füllstands sensor, der vorzugsweise an der Bodenfläche der Grundfläche des Gefäßes (1) angeordnet ist, zum Erfassen der Höhe des Materials, das aus einem Auslassrohr (5) in den entsprechenden Hohlraum des Baublocks eingespritzt wird.

10. Verfahren zum Einspritzen eines flüssigen oder halbflüssigen Materials mit den Schritten von:

i) Eingießen einer vorbestimmten Menge eines

flüssigen oder halbflüssigen Materials in ein Gefäß (1),
 ii) Hochziehen einer oder mehrerer Verbindungsstangen (7), bis die Auslassrohre (5) in eine geöffnete Position gebracht sind,
 iii) Einspritzen einer vorbestimmten Menge des Materials durch eine oder mehrere Auslassrohre (5),
 iv) Herunterdrücken der Verbindungsstangen (7) in Richtung der jeweiligen Auslassrohre (5) bis zur vollständigen Abdeckung der Öffnungen der Auslassrohre (5),

dadurch gekennzeichnet, dass

die Verbindungsstangen (7) einer Abdeckung (4) zugeordnet sind, die auf dem oberen Teil des Gefäßes (1) positioniert ist, wobei die Abdeckung an einem oder mehreren Armen befestigt ist, wobei der eine oder die mehreren Arme durch einen Motor oder eine Kompressoranlage betrieben werden und wobei die Bewegung der Arme der Abdeckung (4) ermöglicht, sich in vertikaler Richtung zu bewegen und die Bewegung der Verbindungsstangen (7) durch die Bewegung der Abdeckung (4) bereitgestellt wird.

11. Verfahren nach Anspruch 10, wobei mindestens eine Verbindungsstange (7) ein unteres Ende (7b) und vorzugsweise eine am unteren Ende (7b) der Verbindungsstange (7) befestigte Verschlussspitze (2) aufweist, um die Öffnung des Auslassrohrs (5) abzudecken, wenn sich die Verbindungsstange (7) in der geschlossenen Position befindet.
12. Verfahren nach Anspruch 10 oder 11, wobei das flüssige oder halbflüssige Material, vorzugsweise Isoliermaterial, in ein Innenvolumen des Gefäßes (1) durch mindestens ein Einlassrohr (6) eingefüllt wird.

Revendications

1. - Appareil d'injection (10) comprenant un réceptacle (1) pour recevoir un matériau en phase liquide ou semi-liquide,
 un couvercle (4) positionné sur la partie supérieure du réceptacle (1),
 au moins un tuyau de sortie (5) sous la forme d'une ouverture,
 au moins une tige de liaison (7) qui est liée audit couvercle (4) et allongée à travers les tuyaux de sortie (5) pour amener un tuyau de sortie (5) relatif en position ouverte ou fermée, **caractérisé par le fait que :**
 ledit couvercle est fixé à un ou plusieurs bras, un mouvement du bras permettant au couvercle (4) et aux tiges de liaison (7)

d'être déplacés ensemble, et ledit ou lesdits bras sont actionnés par un moteur ou un système de compresseur, le mouvement des bras permettant au couvercle (4) d'être déplacé dans une direction verticale.

2. - Appareil d'injection (10) selon la revendication 1, dans lequel ledit couvercle (4) comprend une pluralité de trous, chaque trou étant constitué pour recevoir une tige de liaison (7).
3. - Appareil d'injection (10) selon l'une quelconque des revendications précédentes, dans lequel ladite au moins une tige de liaison (7) comprend un embout de fermeture (2) fixé à son extrémité inférieure (7b) pour recouvrir l'ouverture du tuyau de sortie (5) lorsque ladite tige de liaison (7) est en position fermée.
4. - Appareil d'injection (10) selon l'une quelconque des revendications précédentes, dans lequel un ressort (3) est placé sur au moins une tige de liaison (7), de préférence situé près de l'extrémité supérieure (7a) de la tige de liaison (7) de façon à être adjacent au couvercle (4) .
5. - Appareil d'injection (10) selon la revendication 4, comprenant une butée de ressort (9) fixée sur la tige de liaison (7) pour limiter une position inférieure dudit ressort (3) sur ladite tige de liaison (7).
6. - Appareil d'injection (10) selon la revendication 2, dans lequel un écrou (8) est fixé sur une extrémité supérieure (7a) d'au moins une tige de liaison (7), de façon à maintenir ladite extrémité supérieure (7a) de la tige de liaison (7) à une partie supérieure du couvercle (4) .
7. - Appareil d'injection (10) selon l'une quelconque des revendications précédentes, dans lequel le réceptacle (1) comprend au moins un tuyau de sortie (5), positionné de préférence sur la surface inférieure dudit réceptacle (1).
8. - Appareil d'injection (10) selon l'une quelconque des revendications précédentes, comprenant en outre au moins un tuyau d'entrée (6) sous la forme d'une ouverture, de préférence positionné sur le couvercle (4).
9. - Appareil d'injection (10) selon l'une quelconque des revendications précédentes, comprenant en outre au moins un capteur de niveau, de préférence positionné sur la surface inférieure de la base dudit réceptacle (1), pour détecter une hauteur du matériau injecté à partir d'un tuyau de sortie (5) dans une cavité correspondante du bloc de construction.
10. - Procédé d'injection d'un matériau liquide ou semi-

liquide comprenant les étapes :

- i) verser une quantité prédéterminée d'un matériau liquide ou semi-liquide dans un réceptacle (1), 5
- ii) tirer vers le haut une ou plusieurs tiges de liaison (7) jusqu'à ce que les tuyaux de sortie (5) soient en position ouverte,
- iii) injecter une quantité prédéterminée dudit matériau à travers un ou plusieurs tuyaux de sortie (5), 10
- iv) pousser vers le bas lesdites tiges de liaison (7) vers des tuyaux de sortie (5) relatifs jusqu'à recouvrir entièrement les ouvertures desdits tuyaux de sortie (5), 15

caractérisé par le fait que :

les tiges de liaison (7) sont liées à un couvercle (4) positionné sur la partie supérieure du réceptacle (1), ledit couvercle étant fixé à un ou plusieurs bras, ledit ou lesdits bras étant actionnés par un moteur ou un système de compresseur, et le mouvement des bras permettant au couvercle (4) d'être déplacé dans une direction verticale et le mouvement des tiges de liaison (7) étant assuré par le mouvement dudit couvercle (4). 20 25

11. - Procédé selon la revendication 10, dans lequel au moins une tige de liaison (7) comprend une extrémité inférieure (7b) et, de préférence, un embout de fermeture (2) fixé à ladite extrémité inférieure (7b) de la tige de liaison (7), pour recouvrir l'ouverture du tuyau de sortie (5) lorsque ladite tige de liaison (7) est en position fermée. 30 35

12. - Procédé selon la revendication 10 ou 11, dans lequel ledit matériau liquide ou semi-liquide, de préférence un matériau d'isolation, est versé dans un volume intérieur du réceptacle (1) à travers au moins un tuyau d'entrée (6). 40 45 50 55

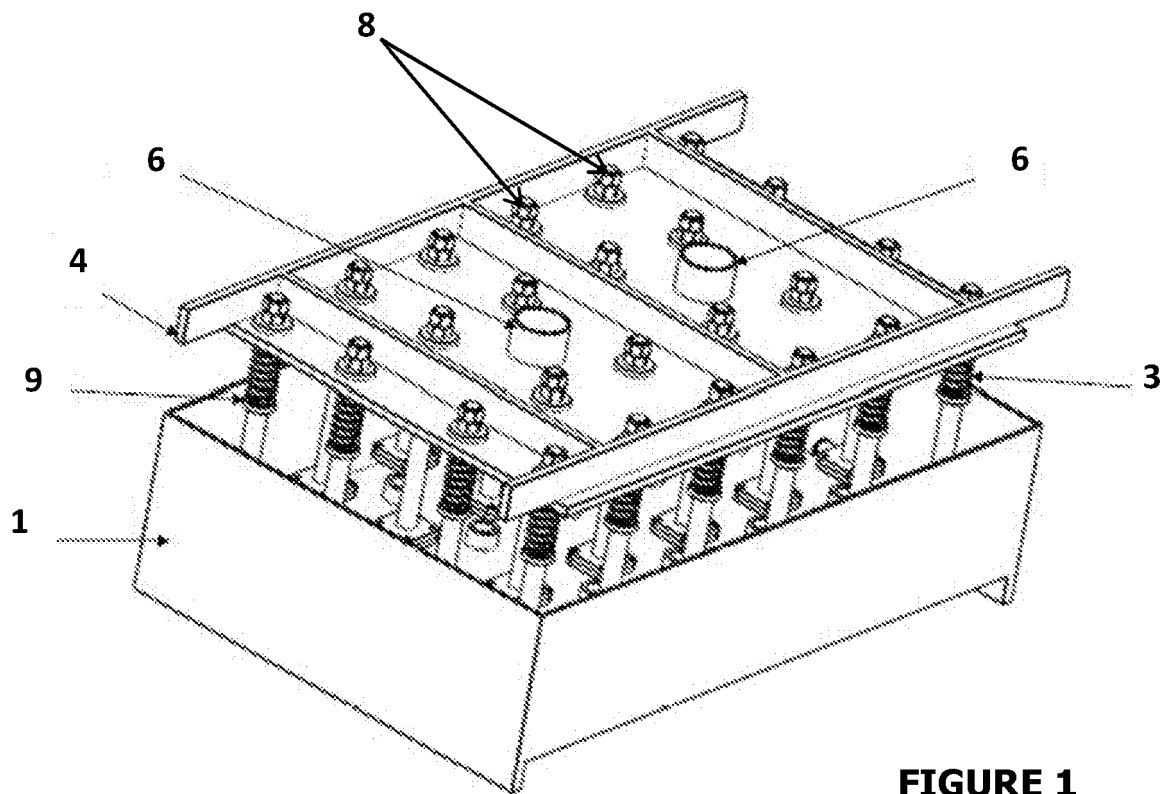


FIGURE 1

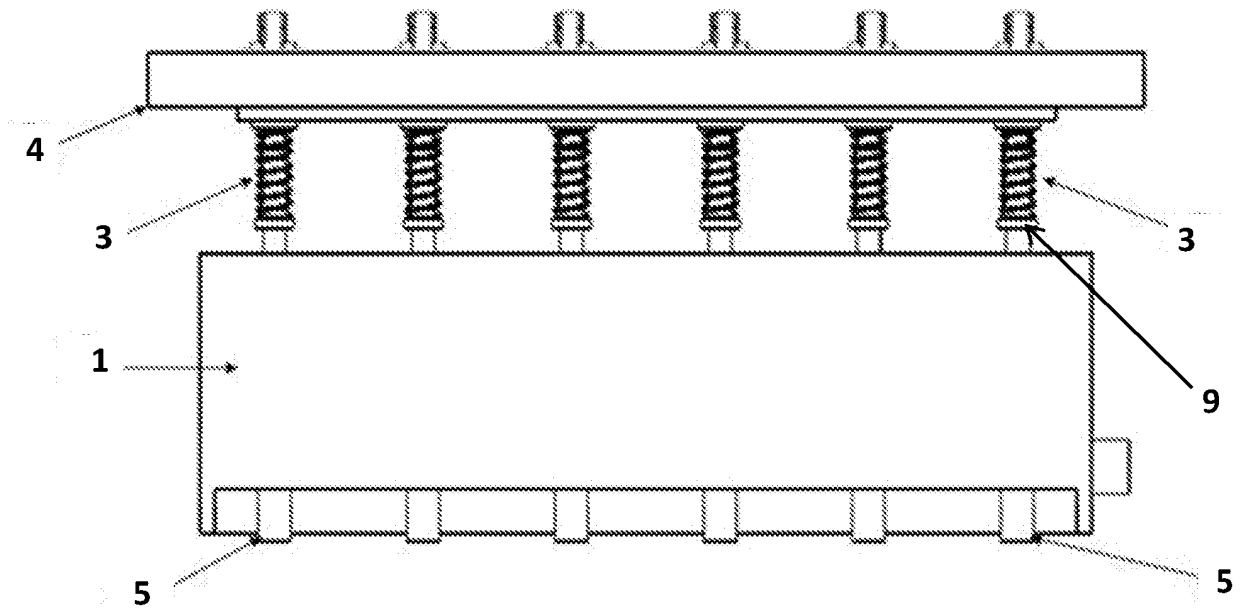


FIGURE 2

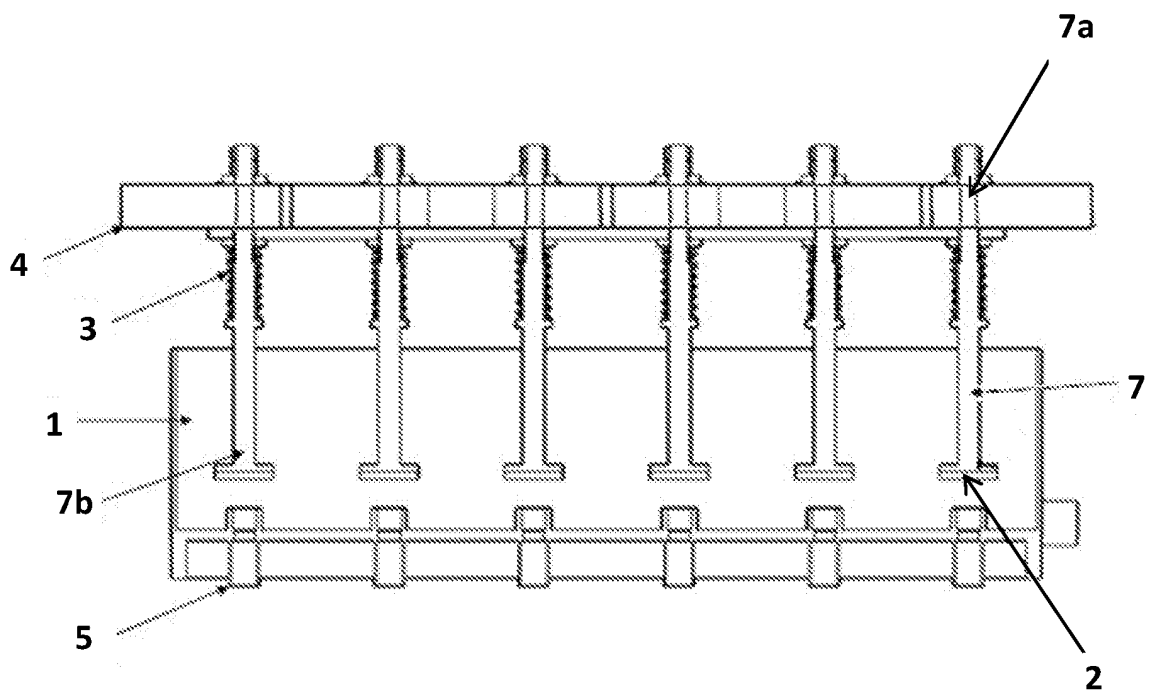


FIGURE 3

REFERENCES CITED IN THE DESCRIPTION

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