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(54) **MORTAR JOINT SPACER**

MÖRTELFUGENABSTANDSSTÜCK

ESPACEUR DE JOINT AU MORTIER

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Description

Field of the Invention

[0001] This invention relates to the field of constructions tools. In particular, the invention relates to a spacing aid for laying of bricks or blocks in the construction of walls or other structures.

Background to the Invention

[0002] A considerable challenge faced by professional masons (trained brick / block layers) is to achieve consistency and uniformity in the thickness of mortar joints. For the DIY enthusiast, achieving such consistency and uniformity is an almost impossible task.

[0003] Industry standard practice is to maintain a specific gap (normally 10 mm) in mortar joints between and along courses of bricks and blocks. The joint space must be maintained both horizontally along the course and vertically between adjacent bricks / blocks. Failure to maintain consistency of mortar joint spacing compromises the overall quality and visual aesthetics of finished brick and block work.

[0004] The consequences of poor quality spacing may not be apparent or observed until several courses or indeed an entire wall has been completed. Corrective action may require that at least several courses be removed and re-laid or in the worst case, require that the entire wall be demolished and rebuilt.

[0005] Such remedial work is time-consuming and costly; both for the mason and the client. As a consequence construction schedules may be disrupted and completions delayed.

[0006] Without the use of a spacer the mason has to (a) constantly remove and reset bricks / blocks thereby reducing his output (b) constantly check horizontal and vertical levels (c) limit the number of courses of bricks / blocks laid in a given timeframe due to the risk of wall instability and mortar being pressed out of lower course joints.

[0007] A number of devices have been developed previously to address the challenges outlined in the above. However such devices have failed to adequately address the mortar joint spacing challenge and have not been adopted or used by the construction industry or mason trades to any great extent.

[0008] There are a number reasons for the lack of adoption and usage of available spacers in the industry. For example, cumbersome designs are often difficult to handle and to position in mortar beds and further unsuitable designs interrupt the normal workflow steps of the mason and consequently reduce output and productivity.

[0009] EP 0 042 065 A1 discloses the preamble of claim 1.

[0010] A mortar joint spacer which overcomes the disadvantages as outlined above would be an improvement over the state of the art.

Summary of the Invention

[0011] According to the present invention, there is provided a spacer device comprising a plurality of members dimensioned to provide a consistent spacing about a construction element relative to the device and forming a first part selectively detachable from a second part to selectively adjust a dimension of the device.

[0012] An advantage of this arrangement is that the device provides for consistent spacing of elements used in the construction of structures. The members are dimensioned such that a consistent spacing is provided for the inclusion of mortar between construction elements. This is particularly advantageous for the construction of structures such as walls where it is industry standard practice to maintain a specific spacing for mortar joints between adjacent construction elements. A further advantage is that parts of the device are selectively detachable such that the dimensions of the device may be adjusted or resized according to the type of structure being built and the type of construction element being used. The invention provides a modular system which may be quickly adapted on-site to fit the dimensions and requirements of the particular structure being constructed.

[0013] A first part of the device is selectively detachable from a second part of the device to selectively adjust the width of the device. A first part of the device is selectively detachable from a second part of the device to selectively adjust the length of the device.

[0014] In this manner the dimensions of the device may be adjusted to suit the requirements of the user and the structure being built.

[0015] The spacer further comprises a third part selectively detachable from the first part. The third part of the spacer is substantially perpendicular to the first and second parts. This provides the advantage of allowing the user to adjust the device for use when a second course of construction elements are placed atop a first course of construction elements.

[0016] The first and second parts of the spacer device are selectively detachable about weakened areas of the members of the device. In this manner, the first and second parts are detachable by a user with greater ease than if the elements were of consistent strength throughout. Furthermore, it allows the weakened areas of the members to act as guides to the user to indicate the dimensions of the device most suited to particular types of construction elements.

[0017] The third part of the device is further selectively detachable about weakened areas of the members of the device.

[0018] The first, second and third parts of the spacer may be detachable without the use of a tool. An advantage of this arrangement is that the dimensions of the device may be adjusted by a user by hand without the requirement for any further tools. This also provides for greater speed of construction as the spacer may be quickly adjusted to suit the needs of the user for the struc-

ture being built.

[0019] The members of the spacer device may be elongate. An advantage of this arrangement is that the amount of material used to fabricate the device is minimised.

[0020] The first and second part of the spacer device comprise a plurality of horizontal members providing a receiving area for construction elements; wherein the horizontal members are dimensioned to provide a consistent spacing about the base of a construction element placed on the receiving area. This is advantageous as it allows for consistency of mortar joint space to be maintained horizontally along the course of a construction.

[0021] The third part of the spacer device comprises at least one vertical member adjoined to the plurality of horizontal members, wherein the vertical members are dimensioned to provide a consistent spacing between a construction element placed on the receiving area of the device and a construction element placed on the receiving area of an adjacent device. This is advantageous as it allows for consistency of mortar joint space to be maintained vertically i.e. between the upstanding faces of construction elements.

[0022] The receiving area of the spacer device may be dimensioned to receive a construction element in the form of a standard brick. The receiving area of the spacer device may be dimensioned to receive a construction element in the form of a standard 100mm block. The receiving area of the spacer device may be dimensioned to receive a construction element in the form of a standard 140mm block. An advantage of these arrangements is that the device is suitable for providing consistent mortar joints between standard bricks and blocks in a variety of constructions. The spacer is further suitable for use with blocks laid in an "on edge" or "on flat" configuration.

[0023] The horizontal members of the spacer device may further comprise a recessed segment along their length to accommodate draining of water from mortar. This is advantageous as it allows for drain off of water from the mortar mix between the construction elements as the mix dries and cures.

[0024] The inner meeting point between adjoining vertical and horizontal members on the spacer device may comprise a recess to accommodate a portion of a construction element. This allows for imperfections or protruding elements on construction elements to be accommodated.

[0025] The outer meeting point between adjoining vertical and horizontal members on the spacer device may comprise a curved joint. This allows for imperfections or protruding elements on construction elements laid on lower courses beneath a spacer device to be accommodated.

[0026] The spacer device may be fabricated from a plastics material. This provides a durable construction to the spacer device and further allows the device to remain in the structure being constructed. The plastics material may comprise HDPE. This provides for a durable, light-

weight construction to the spacer device.

[0027] The members of the spacer device may be dimensioned to provide a consistent spacing of 10mm about a construction element. This spacing is the industry standard for mortar joints between and along the course of bricks and blocks. The benefits of using the spacer device design are immediate and tangible. The quality of finished brick and block work is dramatically improved and the productivity of the mason is significantly increased. Estimates based on trials using the spacer device indicate that productivity in brick laying can be increased by 25% and in block laying by up to 50%.

Brief Description of the Drawings

[0028]

Figure 1 shows a perspective view of the spacer device of the invention

Figure 2A shows a side view of the spacer device of the invention

Figure 2B shows a plan view of the spacer device of the invention

Figure 2C shows an elevation view of the spacer device of the invention

Figure 3 shows a number spacer devices of the invention in place in a wall construction

Detailed Description

[0029] Figure 1 shows a spacer device 1 of the present invention. The device 1 comprises a plurality of members 2 dimensioned to provide a consistent spacing about a construction element relative to the device 1 and forming a first part selectively detachable from a second part to selectively adjust a dimension of the device. Referring to Figure 1, the members 2 form a matrix or grid comprising a series of four sided areas 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14. These areas, in a variety of configurations, form the first and second parts of the device 1. Referring to Figure 1, the parts are selectively detachable from each other along length of the device along the lines indicated by A, B, C, D, E, F, G and H. The parts are selectively detachable from each other along width of the device along the lines indicated by I, J, K. It can be seen, for example, that detaching the part along line G will adjust length of the device while detaching the part along the line K will adjust the width of the device.

[0030] The third part is substantially perpendicular to the first part. The third part is selectively detachable from the first part. Referring to Figure 1, the third part is selectively detachable from the first part along the line the lines indicated by A.

[0031] The members further comprise weakened areas 16 at points along their length. These areas are frangible so that the parts are more easily detached about these areas 16. The weakened areas may also be perforated, taking the form of "snap lines" which allow a user

to snap the device along the lines. The weakened areas may also take the form of a notch in the members. In any of the above manners, the dimensions of the device may be adjusted by a user by hand without the requirement for any further tools.

[0032] The grid which forms the first and second part of the device is comprised of a plurality of horizontal members 2. The horizontal members provide a receiving area for construction elements. The horizontal members are dimensioned to provide a consistent spacing about the base of a construction element placed on the receiving area. That is to say, that the base of a construction element placed on the receiving area of the device will be supported at the same uniform height as a construction element placed on the receiving area of an adjacent device. Furthermore, the third part of the device is comprised of a plurality of vertical members 17 wherein the vertical members are dimensioned to provide a consistent spacing between construction elements placed on the receiving areas of an adjacent devices. That is to say a uniform distance is provided between upstanding surfaces of adjacent construction elements. This will be described further below when the device is described in use.

[0033] The dimensions of the device can be selectively adjusted by detaching any of the areas 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14. Detaching particular combinations of areas provides for receiving areas which are dimensioned to be particularly suited for use with a variety of standard brick and block sizes known to those skilled in the art. The device may also be adjusted by detaching of the vertical members 17 from the horizontal members 2.

[0034] The following spacer types may be formed by detaching a selection of areas from the spacer device.

1. Standard Brick Spacer - also incorporating half brick spacers with and without vertical members
2. Standard 100mm / 4 inch Block Spacer - also incorporating half block spacers with and without vertical members wherein the block is laid in an "on edge" configuration
3. Standard 140mm / 6 inch Block Spacer - also incorporating half block spacers with and without vertical members wherein the block is laid in an "on edge" configuration
4. Standard 100mm & 140mm Block-On-Flat Spacer - also incorporating half brick spacers with and without vertical spacer gap elements

[0035] In addition to being formed by detaching of a selection of areas as described above, each of the spacer types may be manufactured as individual spacer devices. Each of the spacer types 1 to 4 as described above may be manufactured in the required dimensions or adjusted to size by the user.

[0036] For example, with reference to Figure 1, detaching areas 4, 5, 7, 8, 9, 10, 11, 12, 13, 14 provides a receiving area dimensioned to receive a standard brick.

This type of configuration provides the Standard Brick Spacer. Detaching these sections provides a device which is optimally dimensioned to be used in conjunction with a standard brick i.e. the device provides for consistent spacing about the horizontal and vertical surfaces of a series of bricks placed in the receiving areas of a series of spacer devices. It should be noted two standard brick spacers can be formed from a single full spacer device. With referenced to Figure 1, the first standard brick spacer is formed from areas 3, 6 while the second standard brick spacer is formed from areas 5, 8, 11. Furthermore, detaching area 6 provides a half brick spacer. The vertical members may be attached or detached from the standard brick spacer depending on the use required.

[0037] A Standard 100mm/4 inch block spacer is formed by detaching areas 4, 7, 10, 13, 5, 8, 11, 14. Detaching these sections provides a device which is optimally dimensioned to be used in conjunction with a Standard 100mm/4 inch block wherein the block is placed "on edge" i.e. placed on its smaller area surface. It should be noted that two Standard 100mm/4 inch block spacer can be formed from a single full spacer device. With referenced to Figure 1, the first standard brick spacer is formed from areas 3, 6, 9, 12 while the second standard brick spacer is formed from areas 5, 8, 11, 14. Furthermore, detaching area 12 or 14 provides a half block spacer.

[0038] A Standard 140mm/6 inch block spacer is formed by detaching areas 5, 8, 11, 14. Detaching these sections provides a device which is optimally dimensioned to be used in conjunction with a Standard 140mm/6 inch block, wherein the block is placed "on edge" i.e. placed on its smaller area surface. It should be noted that only one Standard 140mm/6 inch block spacer can be formed from a single full spacer device.

[0039] Finally the full spacer device i.e. with no areas detached provides a receiving area optimally dimensioned to be used in conjunction with a Standard 100mm/4 inch or Standard 140mm/6 inch placed with its wider area face in the receiving area. This configuration provides the Standard 100mm & 140mm Block-On-Flat Spacer.

[0040] Figure 2A, B, C shows a spacer device of the present invention in Standard Brick Spacer configuration. The horizontal members comprise recessed areas 18. These areas allow for maximum drain off of water from the mortar mix between the construction elements as the mix dries and cures. It can be seen that the point where the vertical and horizontal members are joined forms a substantially "L" shaped junction. The outer corner 19 of the "L" is provided with a curved area 20 to allow for any protruding lips on elements bricks on the lower course of a construction to be accommodated. It further provides for drain off of mortar water from the joint. The inner corner 21 of the "L" is provided with a recess 22 to again accommodate and protruding lips on bricks being laid in the receiving area of the spacer. Lips and protrusions may arise from the moulding process used to produce

bricks.

[0041] The thickness of the spacer members are dimensioned to be both sufficiently robust and also sufficiently thin to cut through the mortar placed on lower course mortar bed. A thickness of 2mm is found to be suitable.

[0042] The spacer may be made from any suitable durable material. The spacer may be made from a plastics material. The plastics material may be any rigid thermoset plastic such as, for example HDPE or polypropylene. The surfaces of the spacer are moulded in a rough texture finish to enhance the adhesion of mortar to the spacer faces and strengthen the mortar joint.

[0043] Figure 3 shows the spacer device of the present invention in a standard brick spacer configuration in use in a partially constructed wall. Figure 3 shows four courses of a brick wall in various stages of completion. The first course 23 is complete with four bricks laid. The second course 24 is partially complete and further comprises a half brick spacer 27 with vertical members 17. The third course 25 is partially complete and further comprises a standard brick spacer 28 in place ready to receive mortar and a brick into its receiving area. The fourth course 26 is partially complete and comprises a half brick laid over a half brick spacer 29 without vertical members. The spacer device of the invention in use in the construction of a wall is now described.

[0044] The first foundation course 23 of bricks is laid according to bricklaying techniques known to those skilled in the art.

[0045] To construct the second course 24, a mason takes mortar from a mortar bin and places the mortar on a trowel. The mason also takes a spacer device. In the example shown, the spacer device will be adjusted by detaching the vertical members and by removing areas 6, 9 (as shown in Figure 1). The areas are removed by the mason by snapping the device at the predetermined weakened areas. This provides a half brick spacer 29 to be used to begin the second course.

[0046] Mason trowels mortar onto a mortar bed atop the first course and spreads mortar across the required bed size. The spacer 29 is pushed into the mortar bed until contact is made with the lower first course 23. The mason takes a half brick 30 and places it into the receiving area of the half brick spacer 29. Excess mortar is removed by pressing the brick 30 into the receiving area and scraping with the trowel.

[0047] The mason now takes a further spacer. This time standard brick spacer 28 is used with no further areas detached. Mason trowels mortar onto a mortar bed atop the first course 23 and spreads mortar across the required bed size. The spacer is pushed into the mortar bed with the vertical member element 17 pressed up against the previously laid half brick. The mason takes a fresh full brick 31 and 'butters' mortar (trowels mortar onto) the end 32 of the brick.

[0048] The mason pushes the 'battered' end 32 of brick 31 towards the side face of the adjacent half brick 30

(where the vertical spacer member is already in place) and then pushes the brick down 31 into the mortar bed onto the receiving area of the spacer.

[0049] The mason sets the brick into the horizontal and vertical mortar beds by tapping firmly with the trowel handle; ensuring that sufficient mortar has pressed out of the joint to allow for quality 'pointing' and finishing. This process repeats until the end of the course 24 is reached. At the end of the course, a half brick spacer 27 further comprising the vertical members is used to complete the course. The spacer 27 is pressed into a mortar bed 33 and a half brick laid in the same manner as described for the full brick above. The process repeats for the third and further courses until the wall is complete.

[0050] From Figure 3, it can be seen the full spacer device 28 in the third course 25 spans across two bricks 34, 35 in the lower second course 24. This configuration is followed throughout the wall construction, thereby reinforcing the horizontal structure of the finished wall. Furthermore, the spacer allows for a minimum of 18mm from either side of the spacer to the outer edge of the brick, thereby allowing sufficient depth of mortar for quality 'pointing' and finishing between bricks. Furthermore, it should be clear that each spacer is positioned under one brick at a time, thereby each brick is laid independent of adjacent bricks and thus does not interfere with the laying of subsequent bricks. It is further important to note that the spacer devices remain in the completed structure and aid in the curing of the mortar. The recessed section in the members allow maximum drain-off of water from the mortar mix as it dries and cures. Estimates based on trials using the spacer device of the invention indicate that productivity in brick laying can be increased by 25% and in block laying by up to 50%.

[0051] The words "comprises/comprising" and the words "having/including" when used herein with reference to the present invention are used to specify the presence of stated features, integers, steps or components but do not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

[0052] It is appreciated that certain features of the invention, which are, for clarity, described in the context of separate embodiments, may also be provided in combination in a single embodiment, according to the claims set. Conversely, various features of the invention which are, for brevity, described in the context of a single embodiment, may also be provided separately or in any suitable subcombination, according to the claims set.

Claims

1. A spacer device (1) comprising a grid, the grid comprising a plurality of horizontal members (2) forming a first part and a second part, the horizontal members providing a receiving area for a construction element, said first and second part being formed by a series

of four sided areas (3-14), said four sided areas (3-14) being formed by said horizontal members (2); **characterized in that** the first part is selectively detachable from the second part along the length and width of the device, to selectively adjust the dimensions of the receiving area, said horizontal members comprising weakened areas (16) along their length; and wherein the horizontal members are dimensioned to provide a consistent spacing about the base of a construction element placed on the receiving area;

the device further comprising:

a third part substantially perpendicular to the first part and selectively detachable from the first part about weakened areas of the horizontal members;

the third part comprising a plurality of vertical members (17) adjoined to the horizontal members (2), wherein the vertical members are dimensioned to provide a consistent spacing between a construction element placed on the receiving area of the device and a construction element placed on the receiving area of an adjacent device.

2. The spacer device of any preceding claim wherein the receiving area is dimensioned to receive a construction element in the form of a standard brick.
3. The spacer device of claims 1 or 2 wherein the receiving area is dimensioned to receive a construction element in the form of a standard 100mm block.
4. The spacer device of any of claims 1 to 3, wherein the receiving area is dimensioned to receive a construction element in the form of a standard 140mm block.
5. The spacer device of any preceding claim wherein the horizontal members further comprise a recessed segment (18) along their length to accommodate draining of water from mortar.
6. The spacer device of any preceding claim wherein an inner meeting point between adjoining vertical and horizontal members comprises a recess (22) to accommodate a portion of a construction element, and wherein the outer meeting point between adjoining vertical and horizontal members comprises a curved joint (20).
7. The spacer device of any preceding claim wherein the members are dimensioned to provide a consistent spacing of 10mm about a construction element.

Patentansprüche

1. Eine Abstandshaltevorrichtung (1), die ein Gitter mit einer Vielzahl von horizontalen Gliedern (2) aufweist, welche einen ersten Teil und einen zweiten Teil bilden, wobei die horizontalen Glieder einen Aufnahmebereich für ein Konstruktionselement vorsehen, wobei der erste und zweite Teil von einer Reihe vierseitiger Bereiche (3-14) gebildet wird, wobei die vierseitigen Bereiche (3-14) von den horizontalen Gliedern (2) gebildet werden;
dadurch gekennzeichnet, dass
der erste Teil selektiv von dem zweiten Teil entlang der Länge und Breite der Vorrichtung abnehmbar ist, um die Dimensionen des Aufnahmebereichs selektiv anzupassen, wobei die horizontalen Glieder entlang ihrer Länge geschwächte Bereiche (16) aufweisen;
und wobei die horizontalen Glieder dimensioniert sind, um einen gleichbleibenden Abstand um die Basis eines Konstruktionselements herum, das an dem Aufnahmebereich platziert ist, vorzusehen;
wobei die Vorrichtung ferner Folgendes aufweist:

ein drittes Teil, das im Wesentlichen senkrecht zu dem ersten Teil und selektiv abnehmbar von dem ersten Teil ungefähr am geschwächten Bereich der horizontalen Glieder ist;
der dritte Teil eine Vielzahl von vertikalen Gliedern (17) angrenzend an die horizontalen Glieder (2) aufweist, wobei die vertikalen Glieder dimensioniert sind, um einen gleichbleibenden Abstand zwischen einem Konstruktionselement vorzusehen, das an dem Aufnahmebereich der Vorrichtung platziert ist, und einem Konstruktionselement, das an dem Aufnahmebereich einer benachbarten Vorrichtung platziert ist.
2. Abstandshaltevorrichtung gemäß einem der vorhergehenden Ansprüche, wobei der Aufnahmebereich dimensioniert ist, um ein Konstruktionselement in der Form eines Standardsteins aufzunehmen.
3. Abstandshaltevorrichtung gemäß Anspruch 1 oder 2, wobei der Aufnahmebereich dimensioniert ist, um ein Konstruktionselement in der Form eines Standard-100mm-Blocks aufzunehmen.
4. Abstandshaltevorrichtung gemäß Anspruch 1 bis 3, wobei der Aufnahmebereich dimensioniert ist, um ein Konstruktionselement in der Form eines Standard-140mm-Blocks aufzunehmen.
5. Abstandshaltevorrichtung gemäß einem der vorhergehenden Ansprüche, wobei die horizontalen Glieder ferner ein ausgespartes Segment (18) entlang ihrer Länge aufweisen, um ablaufendes Wasser von Mörtel aufzunehmen.

6. Abstandshaltevorrichtung gemäß einem der vorhergehenden Ansprüche, wobei ein innerer Treffpunkt zwischen angrenzenden vertikalen und horizontalen Glieder eine Ausnehmung (22) aufweist, um einen Teil eines Konstruktionselements aufzunehmen, und wobei der äußere Treffpunkt zwischen den angrenzenden vertikalen und horizontalen Gliedern eine gebogene Verbindung (20) aufweist.
7. Abstandshaltevorrichtung gemäß einem der vorhergehenden Ansprüche, wobei die Glieder dimensioniert sind, um einen gleichbleibenden Abstand von 10 mm um ein Konstruktionselement herum vorzusehen.

Revendications

1. Dispositif d'espacement (1) comprenant une grille, la grille comprenant une pluralité d'éléments horizontaux (2) formant une première partie et une deuxième partie, les éléments horizontaux fournissant une zone de réception pour un élément de construction, lesdites première et deuxième parties étant formées par une série de zones à quatre côtés (3-14), lesdites zones à quatre côtés (3-14) étant formées par lesdits éléments horizontaux (2) ;
caractérisé en ce que :

la première partie est sélectivement détachable de la deuxième partie de long de la longueur et de la largeur du dispositif, pour ajuster sélectivement les dimensions de la zone de réception, lesdits éléments horizontaux comprenant des zones affaiblies (16) le long de leur longueur ; et dans lequel les éléments horizontaux sont dimensionnés pour fournir un espacement constant autour de la base d'un élément de construction placé sur la zone de réception ;
le dispositif comprenant en outre :

une troisième partie sensiblement perpendiculaire à la première partie et sélectivement détachable de la première partie autour des zones affaiblies des éléments horizontaux ;

la troisième partie comprenant une pluralité d'éléments verticaux (17) contigus aux éléments horizontaux (2), dans lequel les éléments verticaux sont dimensionnés pour fournir un espacement constant entre un élément de construction placé sur la zone de réception du dispositif et un élément de construction placé sur la zone de réception d'un dispositif adjacent.

2. Dispositif d'espacement selon l'une quelconque des revendications précédentes, dans lequel la zone de

réception est dimensionnée pour recevoir un élément de construction se présentant sous la forme d'une brique standard.

3. Dispositif d'espacement selon les revendications 1 ou 2, dans lequel la zone de réception est dimensionnée pour recevoir un élément de construction se présentant sous la forme d'un bloc standard de 100 mm.
4. Dispositif d'espacement selon l'une quelconque des revendications 1 à 3, dans lequel la zone de réception est dimensionnée pour recevoir un élément de construction se présentant sous la forme d'un bloc standard de 140 mm.
5. Dispositif d'espacement selon l'une quelconque des revendications précédentes, dans lequel les éléments horizontaux comprennent en outre un segment évidé (18) le long de leur longueur pour recevoir l'évacuation d'eau du mortier.
6. Dispositif d'espacement selon l'une quelconque des revendications précédentes, dans lequel un point de rencontre interne entre les éléments verticaux et horizontaux contigus comprend un évidement (22) pour loger une partie d'un élément de construction, et dans lequel le point de rencontre externe entre les éléments verticaux et horizontaux contigus comprend un joint incurvé (20).
7. Dispositif d'espacement selon l'une quelconque des revendications précédentes, dans lequel les éléments sont dimensionnés pour fournir un espacement constant de 10 mm autour d'un élément de construction.

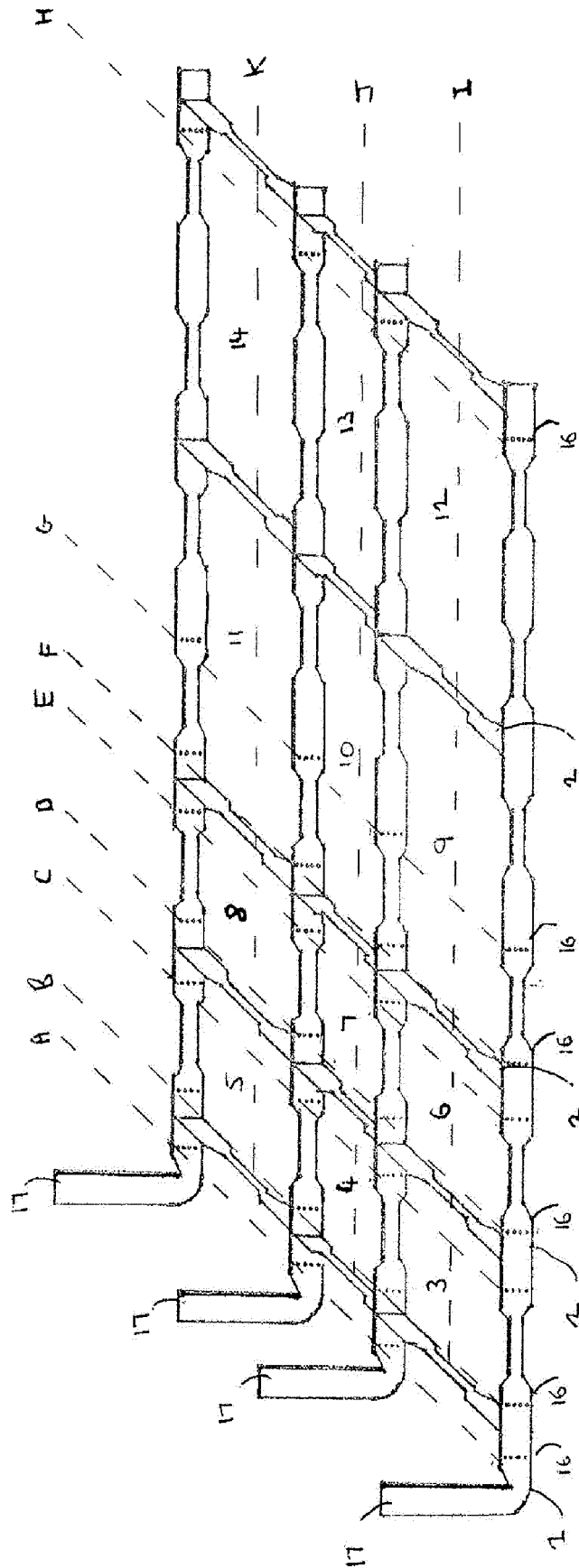


Figure 1

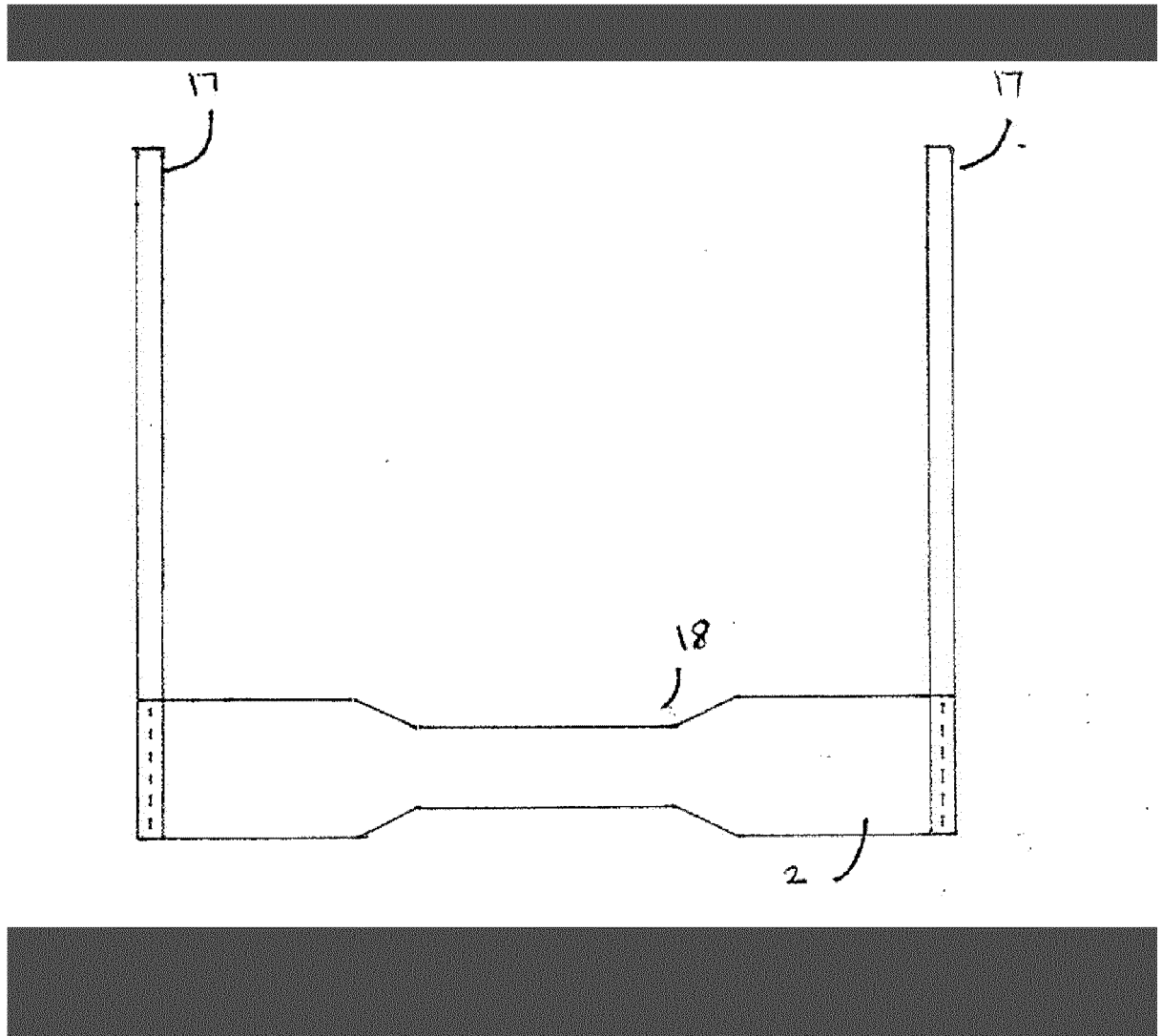


Figure 2A

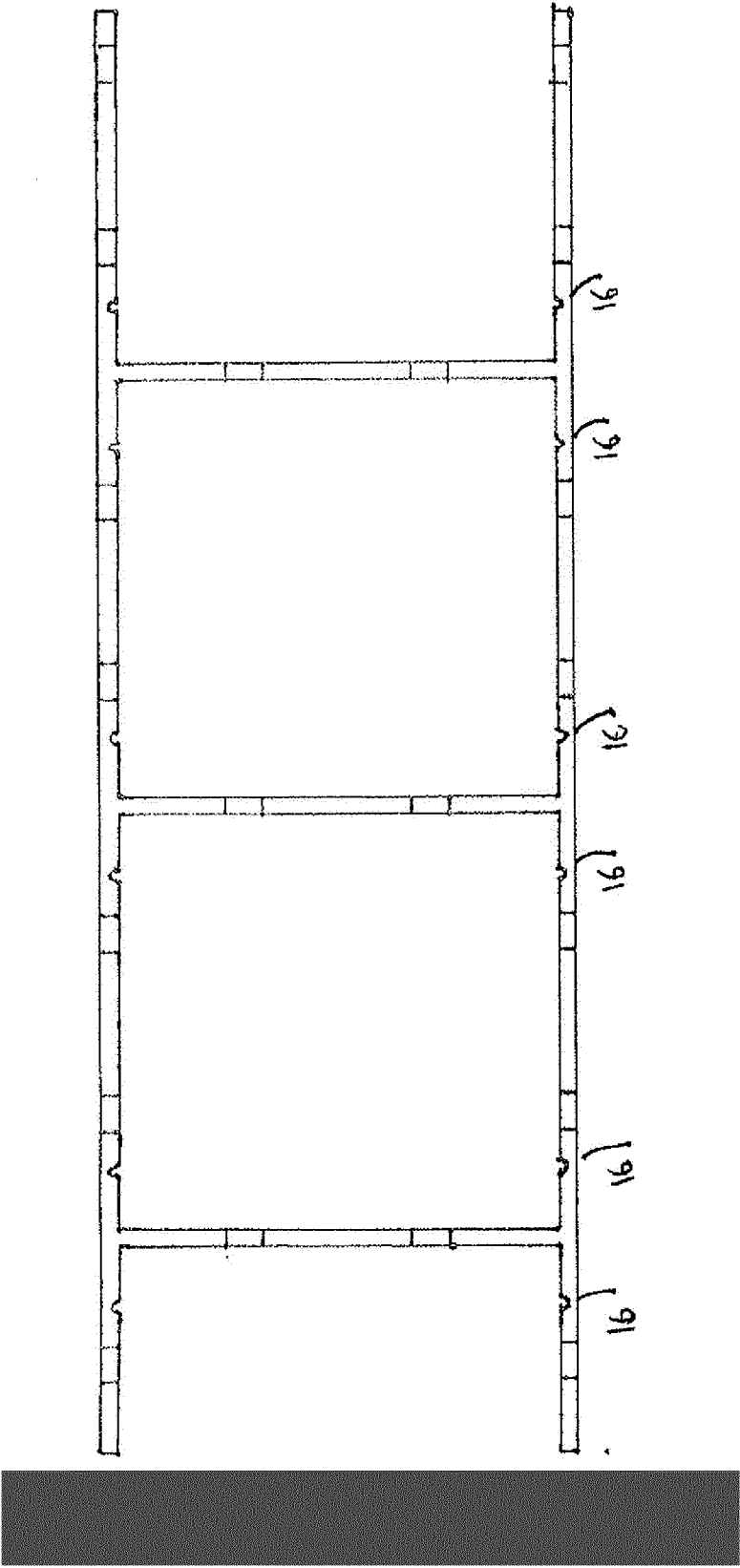


Figure 2B

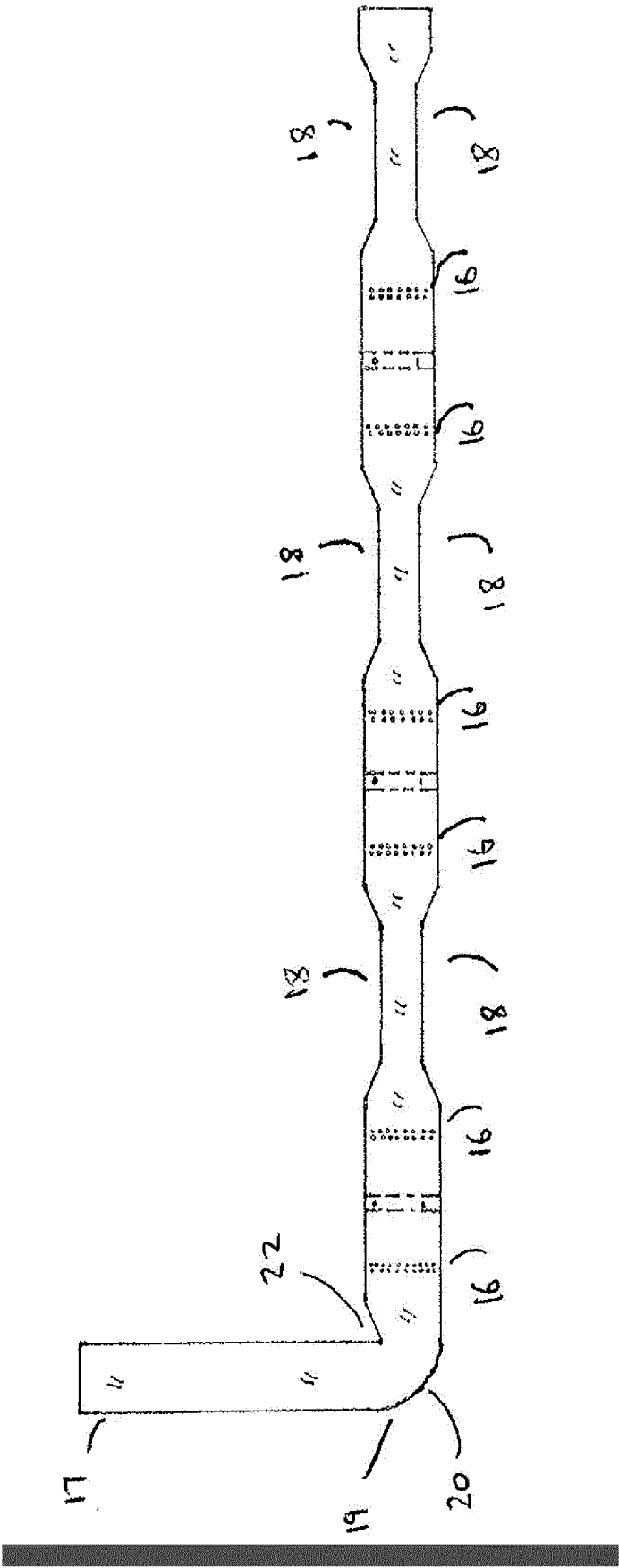


Figure 2C

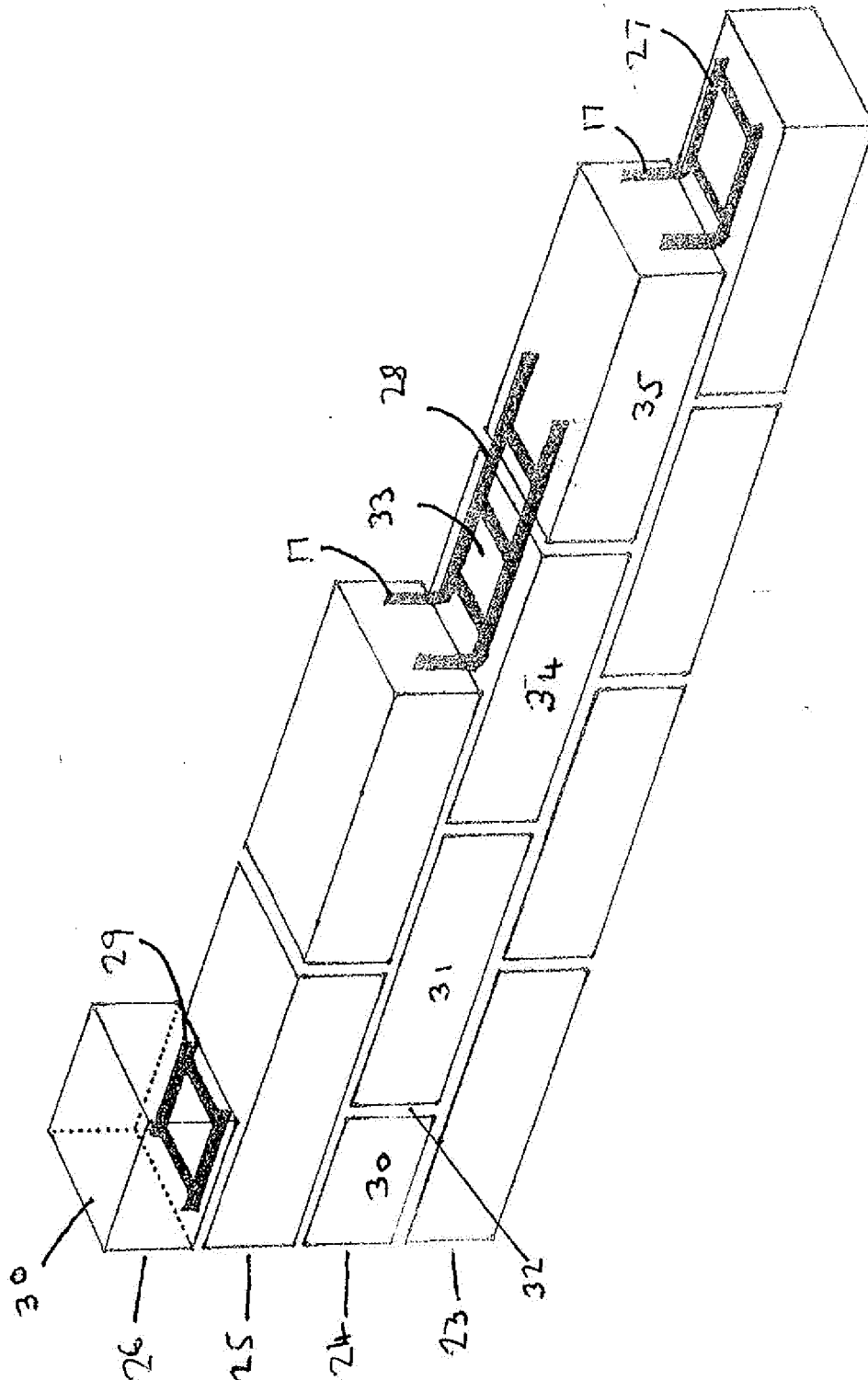


Figure 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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