(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 803 620 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
29.10.1997 Bulletin 1997/44

(51) Int Cl.[6]: **E04G 21/18**

(21) Application number: **97201219.9**

(22) Date of filing: **24.04.1997**

(84) Designated Contracting States:
DE FR GB NL

(30) Priority: **26.04.1996 BE 9600373**

(71) Applicant: **Bouwbedrijf Marchetta, besloten vennootschap met beperkte aansprakelijkheid**
3600 Genk (BE)

(72) Inventor: **Marchetta, Emilio**
3520 Zonhoven (BE)

(74) Representative: **Donné, Eddy**
Bureau M.F.J. Bockstael nv
Arenbergstraat 13
2000 Antwerpen (BE)

(54) Alignment element

(57) Alignment element, more particularly an alignment element for the application during bricklaying, characterized in that it is substantially composed of a profile (2) and adjustment means which are provided at this profile (2) and allow, when this profile (2) is placed against a wall, to adjust the position of this profile, or eventually a part of this profile, in respect to this wall.

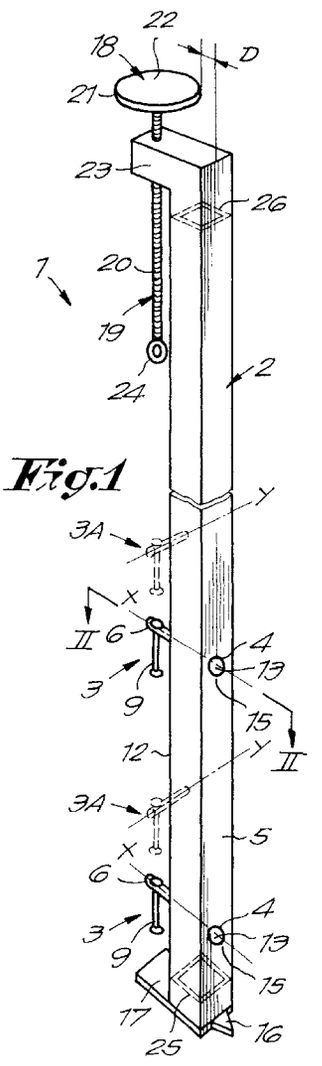


Fig.1

EP 0 803 620 A1

Description

This invention relates to an alignment element which, in first instance, is intended for the application during bricklaying but which, more generally, can also be used in other applications.

More particularly, the invention relates to an alignment element in the form of a profile.

It is known that for bricklaying of walls and similar often profiles are used as alignment elements in order to have a guidance at hand in order to mason, for example, in a straight line, either upwards when bricklaying takes place along this profile, or in horizontal direction when this profile is used for tensioning a masonry guide line.

In general, the aforementioned profile is positioned upright by means of additional supports, which is relatively cumbersome. As a result, the exact adjustment of the profile is rendered rather difficult.

The invention aims at an alignment element with which, among others, the aforementioned disadvantage can be excluded.

To this aim, the invention consists of an alignment element which is characterized in that it is composed of a profile and adjustment means which are provided at this profile and allow, when this profile is placed against a wall, to adjust this profile, or eventually a part of this profile, in respect to this wall.

Preferably, the adjustment means consist of adjustment elements provided locally at one or more locations.

In order to allow for an optimum adjustment, the profile shall be provided at least at two places with such adjustment elements. More particularly it is preferred that two adjustment elements, situated one above the other at a well-defined distance, are present in the lower part of the profile, at least when the latter is positioned upright, and this in the lower third, seen in respect to the total length.

Hereby, the adjustment means preferably consist of one or more elements, preferably screw elements which are attached turnable in or at the profile and which can be brought with their foremost extremity up to outside a face of the profile.

The application of these adjustment means creates the possibility to push the profile at well-defined places somewhat away from the wall against which it is attached and to position the profile in doing so.

In this manner, an alignment element is made available which can easily be attached against an already existing part of a wall and which can be adjusted very precisely in order to finish the upper part of the wall.

Preferably, the profile, at the side which is intended to be placed against a wall, and eventually at several sides, is provided with one or more anchoring elements allowing for an anchoring in a wall, more particularly in the joints thereof.

The alignment element according to the invention can also be provided with a support element, adjustable in height, for example, for supporting a casing, support beam or similar.

The invention also aims at an alignment element, more particularly a profile, with which a masonry guide line can be attached easily at the exact height, with the characteristic that this element to this aim comprises one or both of the following auxiliary accessories for tensioning a masonry guide line:

- means adjustable in height, in other words, in the longitudinal direction of the profile, for the attachment of a masonry guide line;
- a measuring scale, adjustable in the longitudinal direction of the profile, which scale is formed of at least one series of markings, provided at equal distances to each other, for tensioning the masonry guide line at the exact height.

Although the profile, in the most preferred form of embodiment, preferably is provided with the adjustment means as well as with both aforementioned auxiliary accessories, the invention does not exclude the forms of embodiment whereby the profile is provided exclusively with adjustment means or exclusively with one or both of aforementioned auxiliary accessories.

With the intention of better showing the characteristics according to the invention, several preferred forms of embodiment are described hereafter by means of example only and without any limitative character, with reference to the accompanying drawings, wherein:

figure 1 represents an alignment element according to the invention;
figure 2 represents a cross-section according to line II-II in figure 1;
figure 3 represents a view similar to that of figure 2, but for a variant;
figure 4 represents the alignment element of figure 1 during the application thereof;
figure 5 represents a cross-section according to line V-V in figure 4;
figure 6 represents a variant of an alignment element according to the invention, during the application thereof;
figures 7 and 8 represent cross-sections according to lines VII-VII and VIII-VIII in figure 6;
figure 9 represents a variant of the part shown in figure 2;
figure 10, in cross-section, represents another variant of the invention;
figure 11 represents a cross-section according to line XI-XI in figure 10;
figure 12, on a smaller scale, represents a view according to arrow F12 in figure 10;
figure 13 represents a cross-section according to line XIII-XIII in figure 10.

As represented in figure 1, the alignment element 1

according to the invention substantially consists of a profile 2 which is provided with adjustment means, more particularly one or more locally provided adjustment elements, such as screw elements 3 with which the position of such profile 2 in respect to a wall, as explained hereafter, can be adjusted.

As shown in figure 2, the screw elements 3 are attached turnable in the profile 2, in such a manner that they can be brought with their foremost extremity 4 up to outside a face 5 of the profile 2.

Preferably, the screw elements are formed by threaded rods 6 which pass crosswise through the profile 2 and which, at the extremity 4 situated opposite to extremity 4, can be turned by means of a handle portion 8. This handle portion 8 preferably is provided with a turning key 9, as shown in figure 1. According to a variant, this handle portion 8 may also be realized in a different manner and, for example, can be formed by a round knob or also by an eye-shaped part through which a nail or similar can be put which simplifies the screwing in and out, or still by any other means enabling the turning of the threaded rod 6.

The profiles 2 preferably are hollow. Preferably, they also show a square or rectangular cross-section, as a result of which they can easily be positioned against a wall. In the most preferred form of embodiment, use shall be made of an aluminium profile.

According to an important variant, the profile 2 can also be made of steel or iron.

In the case of a hollow profile 2, the threaded rods 6 preferably are turnable in holding elements 11, provided with screw thread 10, which, for example, consist of a sleeve or similar which is provided at the rear side 12 or is realized in one piece therewith.

The aforementioned extremity 4 of the applied screw elements 3 may be provided with a support foot 13, which provides for a greater stability during the tensioning against a wall. As represented in figure 2, such support foot 13, in its most simple form of embodiment, can be formed by a small disc which is fixedly mounted onto the extremity of the threaded rod 6.

According to a variant, use can be made of a movable support foot 13, for example, as represented in figure 3, by means of mounting a ball-and-socket joint 14 between the threaded rod 6 and the support foot 13.

The screw elements 3 can, at their foremost extremity, by screwing in these screw elements 3, be completely countersunk in respect to the aforementioned face 5, such that the profile 4 can be attached with the face 5 against a wall at any time. In order to allow for that, an opening 15 is provided in the face 5 of the profile 2, at the location of each screw element 3, which opening 15 leaves a free passageway for the screw element 3, as well as for the related support foot 13.

As shown in figure 1, the profile 2 may be provided with an anchoring element 16, which allows an anchoring in a wall, for example, in a joint between two rows of bricks. This anchoring element 16 preferably consists of a projecting lip which, as represented in figure 1, is situated at the aforementioned face 5.

As also represented, this anchoring element 16 preferably is situated at the lower side of profile 2 and has a tapering shape. It also has relatively small dimensions, such that it can easily be driven into a joint. Opposite to the anchoring element 16, an element 17 may be provided onto which a force can be exerted, for example, beaten with a hammer, without damaging the profile 2.

As represented in figure 1, according to the invention the alignment element 1 may eventually be equipped with a support element 18 which is adjustable in height and which preferably is situated at the upper extremity of the profile 2. The adjustment hereof preferably is realized by means of a threaded rod 19 or a worm screw. In order to allow for a rapid adjustment, the threaded rod 19 shall be provided with screw thread 20 with a relatively large thread pitch, for example in the order of magnitude of one centimeter.

The support element 18 preferably comprises a support plate 21 with a horizontal upper plane 22. Hereby, the support plate 21 may be formed of a round disc which is attached at the upper extremity of the aforementioned threaded rod 19.

Preferably, the support element 18 is fitted in a turnable manner in a support part 23 which protrudes laterally from the profile.

In order to render the turning of the threaded rod 19 easier, the latter is provided with a handle portion 24 which, in the represented example, is formed by an eye-shaped element through which a nail or similar can be put in order to be able to exert a large force during turning.

It is noted that the support element 18 preferably is placed offeset in backward direction in respect to the face 5 in which the support feet 13 are countersunk, as schematically indicated by distance D, as a result of which the support element 18 does not form an obstacle for attaching the profile 2 against a wall, or this support element 18 can not be an obstacle for further bricklaying a wall alongside the positioned profile 2.

It is clear that the anchoring elements 16 and the support element 18 are optional elements. In a variant, these elements, as a matter of fact, may not be present, as a result of which the profile 2, then, ends up at the extremities 25 and 26 schematically indicated in figure 1.

The application of the alignment element 1 from figure 1 is illustrated in figures 4 and 5, whereby a positioning for bricklaying an opening 27 is represented. Hereby, the profile 2 is attached against an already existing part 28 of the wall. To this end, the anchoring element 16 is attached in a joint 29, and the profile 2 is clamped against the existing part 28 by means of a clamping element 30 which can be of any nature.

In practice, such clamping always allows a small movability of the profile. By making use of this movability

and by turning the screw elements 3, the profile 2 can be turned somewhat, as indicated with arrows A and B, as a result of which an adjustment can be performed, more particularly, this profile may positioned upright, eventually by means of a mason's level. It is noted that such mason's level eventually can be incorporated in the profile 2.

It is clear, that in this manner certain inaccuracies in the positioning of the profile 2 may be counterbalanced.

In order to be able to easily perform a correction in the directions of the arrows A as well as B, the alignment element 1 preferably shall be provided with at least two adjustment elements, more particularly screw elements, and shall the clamping during the use thereof take place at a location between these two screw elements 3.

Figure 4 also shows how a template 31, for example, for masoning an arc, can be supported by the alignment element 1 according to the invention. A first positioning in height hereby can be obtained by attaching the profile 2 at a well-defined height, by means of the anchoring element 16. A second positioning and proper adjustment of the surface 22 of the support plate then is performed by turning the threaded rod 19.

It is clear that the profile 2 may be realized in various lengths and, instead of being provided with two screw elements 3 or similar, may also be provided with only one or more than two.

Preferably, at least two adjustment elements are present in the lower part of the profile, and this in the lower third, seen in respect to the total length.

In the most preferred form of embodiment, the profile 2 shall have a length in the order of magnitude of 2,75 m and does comprise three screw elements 3, located at, respectively, 8 cm, 50 cm, and 85 cm from the lower extremity.

According to a variant, the profile 2 may also be provided with adjustment means which allow adjustments in different directions, for example, X and Y, as indicated in figure 1, for example, by means of additional screw elements 3A which are turnable in a direction Y perpendicular to the movement direction X of the first-mentioned screw elements 3.

In figures 6 to 8, a variant is represented whereby the profile 2 is filled with a core 32. Hereby, the seats 11 are formed by cylinders which are fixed in borings 33 in the core, such that only two openings 15 and 34 have to be realized in the metal profile 2.

The embodiment from figures 6 to 8 also shows the characteristic that no projecting parts are present at the profile 2 at the location of the adjustment means, as a result of which such profile 2 can also be applied for other purposes. Hereby, this characteristic is realized by replacing the aforementioned handle portion 8 by a seat 35, countersunk in the contour of the profile 2, for insertion of, for example, a socket screw key.

It is clear that such embodiment, whereby the screw elements 3 are arranged completely inside the profile 2, at least when they are screwed in, can also be realized withouth the necessity of a core 32.

According to a particular characteristic of the invention, the profile 2 is provided with seats 2 for the attachment of a clamping element 30. As represented in figures 6 and 8, theses seats 36 preferably consist of a portion which is surrounded by a perpendicular edge 37 which has to render the positioning of the clamping element 30 easier and at the same time prevents that this clamping element 30 easily slides away from the profile 2.

In figure 9, a variant of a screw element 3 is represented, whereby the handle portion 8 consists of an eye-shaped part, formed by a flat ring, through which, eventually, a nail or such can be put in order to render turning easier.

As represented in figure 10, the aforementioned adjustment means can also be attached in a longitudinal profiled section 38, provided to this end at the profile 2, which preferably consists of a groove 39 with inwardly directed edges 40-41, for example, in the shape of a swallowtail.

Hereby, the adjustment means are formed by a screw element 3 which is turnable in a support part 42, provided in the longitudinal profiled section 38, more particularly, in the groove 39, which part 42, when the screw element 3 is tensioned, cooperates with the inwardly directed edges 40-41. As represented in figure 11, this support part 42 preferably consists of a rectangular block or similar which, for example, is slid into the groove 39 along an extremity of the profile 2.

As further represented in figure 10, the profile 2 can be provided with a second longitudinal profiled section 43, more particularly a groove, allowing that a support foot 13 which is eventually attached at the front extremity of the screw element 3, can be countersunk in the profile 2.

The screw element 3 is held at its place as the threaded rod 6 is put through opposite openings 44 and 45 which are provided in the profil sections 38, 39 respectively. Such openings can be provided at various heights, such, that the adjustment means can be mounted at the desired height. As represented in figure 11, the openings 44-45 can also be part of a series of perforations.

As represented in figures 10 and 12, the profile 2 may also be equipped with height-adjustable means 46 for the attachment of a masonry guide line 47.

These means 46 preferably consist, one one hand, of a longitudinal profiled section 48, preferably in the shape of a groove 49 with inwardly directed edges 50-51, for example, a swallowtail, and, on the other hand, an element 52 at which the masonry guide line 47 can be attached, whereby this element, by means of clamping means, can be clamped on at any height in the groove 49. As represented in figure 10, these clamping means preferably are composed of, on one hand, a clamping element 53 in the form of a nut which is shift-

able, but not turnable, in the groove and cooperates with the edges 50-51, and, on the other hand, a screw thread portion 54 which forms part of element 52, which is screwed through the clamping element 53 and can be tensioned with its free extremity against the bottom of the groove 49.

Furthermore, the element 52 maybe provided with a groove 55 for the attachment of the masonry guide line 47 and/or of a winding plate 56 or similar for winding up the end of the masonry guide line 47, by means of which also the element 52 can be fastened and loosened manually in an easy manner.

By loosening the element 52, this can be shifted in the groove 49 together with the clamping element 53. By fastening the element 52, the whole unit is tensioned between the bottom of the groove 49 and the edges 50-51, as a result of which a clamping at every desired height can be realized.

It is clear that the profile 2 can also be provided with several profiled sections for the attachment of an element 52. For example, in profile 2 of figure 10, thus, a second longitudinal profiled section 57 is provided in the opposite face.

Preferably, the profile 2 has a rectangular cross-section and the longitudinal profiled sections 38 and 48 are provided at two sides of this profile which are perpendicular to each other. It is, however, not excluded to attach the elements 52 in the same groove 39 as the adjustment means. Neither is it excluded to provide the support element 42 behind the foot 13 in the longitudinal profiled section 43, as a result of which the groove 39 becomes redundant.

As represented in figure 12, a measuring scale 58 may be provided at the profile 2, with markings 59 which are provided subsequently at equal distances to each other, whereby this distance is equal to the distance between two subsequent rows of bricks to be masoned, in such a manner that these markings 59 can be applied for adjusting the element 52, and, thereby, the masonry guide line, too, at the exact height.

In the most simple form of embodiment, such measuring scale shall be provided fixedly at the profile 2 or shall be glued onto it in the form of a band on which one or more rows of markings are depicted.

As represented in figures 10, 12 and 13, anyhow, in the most preferred form of embodiment, use shall be made of a measuring scale 58 which is adjustable in the longitudinal direction of the profile 2.

This measuring scale preferably consists of a lath 60, provided with markings, which is provided with attachment means 61 with which this lath can be positioned in height and be attached at the profile 2 in the desired position.

Hereby, the lath 60 may be fitted displaceable in a longitudinal profiled section 62, preferably a groove, more particularly in the shape of a swallowtail. The attachment means 61 may then consist of one or more elements 63 to be screwed in, by means of which the lath 60 can be clamped in the longitudinal profiled section 62, similar as the clamping element 53 in the longitudinal profiled section 48.

The markings 59 can consist of notches which simultaneously form a seat for the masonry guide line.

In a practical form of embodiment, the lath 60 shall be shorter than the profile 2. In the case of a profile of 2,75 m, the lath 60, for example, shall have a length of 1,60 m.

When applied, the lath 60 is adjusted at the exact height, this subsequently to attaching the profile 2 at its location.

Several interchangeable laths 60, with different measuring scales, may belong to the profile 2.

The profile 2 from figures 10 to 13 has as an advantage that it is optimally appropriate for being realized in aluminium. Hereby, such profile 2 can be manufactured by means of extrusion. Due to the use of longitudinal profiled sections for the attachment of the adjustment means, the element 52 and the lath 60, it is not necessary to fix any elements at the profile 2 by welding, as a result of which the difficulty of welding at aluminium is excluded.

The element 17, however, shall be manufactured of steel, as this, then, is more resistive against the blows exerted thereupon.

It is clear that the present invention is in no way limited to the forms of embodiment described by means of example and represented in the figures, but that, on the contrary, such alignment element can be realized in various forms and dimensions without leaving the scope of the invention.

So, for example, may the profile be composed of two parts which are mutually adjustable, whereby a first part can be clamped against a wall, whereas the second part, which, for example, is situated above the first part, can be positioned in function of the work to be realized.

Claims

1. Alignment element, more particularly an alignment element for the application during bricklaying, characterized in that it is substantially composed of a profile (2) and adjustment means which are provided at this profile (2) and allow, when this profile (2) is placed against a wall, to adjust the position of this profile, or eventually a part of this profile, in respect to this wall.

2. Alignment element according to claim 1, characterized in that the adjustment means consist of locally provided adjustment elements and that the profile (2) is provided with such adjustment elements at least at two locations.

3. Alignment element according to claim 2, characterized in that at least two adjustment elements, situ-

ated one above the other at a well-defined distance, are present in the lower part of the profile (2), and this in the lower third, seen in respect to the total length.

4. Alignment element according to any of the aforegoing claims, characterized in that the adjustment means consist of one or more elements, preferably screw elements (3) attached turnable in or at the profile (2) and which can be brought with their foremost extremity (4) up to outside a face (5) of the profile (2) which is intended to be placed against a wall.

5. Alignment element according to claim 4, characterized in that each respective screw element (3) is formed by a threaded rod (6) which extends crosswise through the profile and which, at the extremity (7) situated opposite to the aforementioned foremost extremity (4), can be turned by means of a handle portion (8) provided thereupon, which is provided with a turning key (9), an eye-shaped part or another means enabling to turn the threaded rod (6).

6. Alignment element according to claim 4 or 5, characterized in that each respective screw element (3) at its foremost extremity (4) is provided with a support foot (13) which preferably is turnable and/or tiltable.

7. Alignment element according to any of the claims 4, 5 or 6, characterized in that the screw elements (3) at their foremost extremities (4), by screwing in these screw elements (3), can be completely countersunk in respect to the face (5) of the profile (2) in which they are provided.

8. Alignment element according to claim 7, characterized in that the profile (2) consists of a hollow rectangular or square profile (2) made of metal; that the threaded rod (6) is fixed in a seat (11) situated at the rear side (12) of the profile (2); and that the screw element (3), at its free extremity (4), can be countersunk in the profile (3) because in the face (5) which is situated opposite to the rear side (12), an opening (15) is provided which leaves a free passageway for the threaded rod (6) and, if necessary, also for the support foot (13).

9. Alignment element according to any of the aforegoing claims, characterized in that the profile (2) at the face (5) which is intended to be placed against a wall, and eventually at several sides, is provided with one or more anchoring elements (16) which allow for an anchoring in a wall.

10. Alignment element according to claim 9, characterized in that the profile (2) to this aim at its lower extremity is provided with a projecting lip having a tapering shape.

11. Alignment element according to any of the aforegoing claims, characterized in that it is provided with a support element (18) which is adjustable in height.

12. Alignment element according to claim 11, characterized in that the adjustable support element (18) substantially consists of a support plate (21) which can be moved up and down by means of a threaded rod (19).

13. Alignment element according to claim 11 or 12, characterized in that the support element (18) is situated at the upper extremity of the profile (2) and extends beyond the latter; and that this support element (18) is positioned offset in backward direction in respect to that face (5) of the profile (2) which is intended to be placed against a wall.

14. Alignment element according to any of the aforegoing claims, characterized in that the adjustment elements in drawn-in position are situated completely within the contour of the profile (2), more particularly in such a manner that the profile (2) does not comprise any projecting parts.

15. Alignment element according to any of the aforegoing claims, characterized in that the profile (2) is provided with seats (32) for placing a clamping element (30).

16. Alignment element according to any of the aforegoing claims, characterized in that the adjustment means are fixed in a longitudinal profiled section (38) provided at the profile (2).

17. Alignment element according to claim 16, characterized in that the longitudinal profiled section (38) consists of a groove (39) with inwardly directed edges (40-41), preferably in the shape of a swallowtail, and that the adjustment means consist of a screw element (3) which is turnable in a support part (42), provided in the groove (39), which support part (42), during tensioning of the screw element (3), cooperates with the inwardly directed edges (40-41).

18. Alignment element according to claim 16 or 17, characterized in that the profile (2) is provided with a longitudinal profiled section (43) which allows a countersinking of a support foot (13).

19. Alignment element according to any of the aforegoing claims, characterized in that the profile (2) is equipped with one or both of following accessories for tensioning a masonry guide line (47):

- means adjustable in height, in other words, in the longitudinal direction of the profile (2), for the attachment of a masonry guide line (47);
- a measuring scale (58), adjustable in the longitudinal direction of the profile (2), which scale is formed of at least one series of markings (59), provided at equal distances to each other, for tensioning the masonry guide line (47) at the exact height.

20. Alignment element, more particularly a profile, characterized in that it comprises one or both of the following accessories for tensioning a masonry guide line:

- means adjustable in height, in other words, in the longitudinal direction of the profile (2), for the attachment of a masonry guide line (47);
- a measuring scale (58), adjustable in the longitudinal direction of the profile (2), which scale is formed of at least one series of markings (59), provided at equal distances to each other, for tensioning the masonry guide line (47) at the exact height.

21. Alignment element according to claim 19 or 20, characterized in that the means (46) for the attachment of the masonry guide line (47) consist of, on one hand, a longitudinal profiled section (48) in the profile (2), preferably in the shape of a groove (49) with inwardly directed edges (50-51), such as a swallowtail, and, on the other hand, an element (52) at which a masonry guide line (47) can be attached, which, by means of tensioning means, can be clamped on at any height at the longitudinal profiled section (48).

22. Alignment element according to claim 21, characterized in that the height-adjustable means (46) show one of the following or a combination of two or more of the following features:

- that these means (44) are provided with tensioning means formed by a clamping element (53), cooperating with the inwardly directed edges (50-51), through which the aforementioned element (52) is screwed down;
- that the aforementioned element (52) is provided with a groove (55) for the attachment of the masonry guide line (47);
- that the aforementioned element (52) is provided with a winding plate (56) or similar.

23. Alignment element according to any of the claims 19 to 22, characterized in that the measuring scale (58) adjustable in the longitudinal direction of the profile consists of a lath (60), provided with markings, which is provided with attachment means (61) with which this lath can be positioned in height and be attached at the profile (2) in the desired position.

24. Alignment element according to claim 23, characterized in that the lath (60) is fitted displaceable in a longitudinal profiled section (62), preferably a groove, more particularly in the shape of a swallowtail, and that the attachment means (61) consist of one or more screwable elements (63) by means of which the lath (60) can be clamped in the longitudinal profiled section (62).

25. Alignment element according to any of the claims 16 to 18 and claim 19, characterized in that the profile (2) is rectangular and that the longitudinal profiled sections (38-48-57-62), respectively for the adjustment means and for the means (46) for the attachment of the masonry guide line (47) and/or for the attachment of the height-adjustable measuring scale (58) are provided at two sides of the profile (2) which are perpendicular to each other.

26. Alignment element according to any of the claims 16 to 25, characterized in that the profile (2), together with the longitudinal profiled sections (38-46-57-62) present herein, are formed of extruded aluminium.

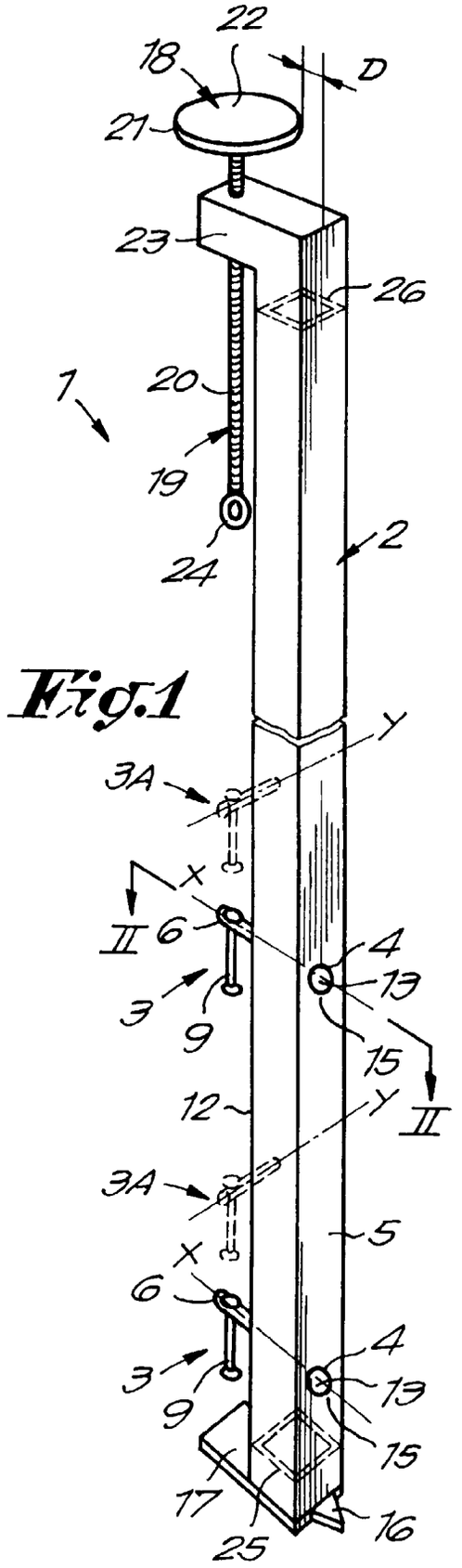


Fig.1

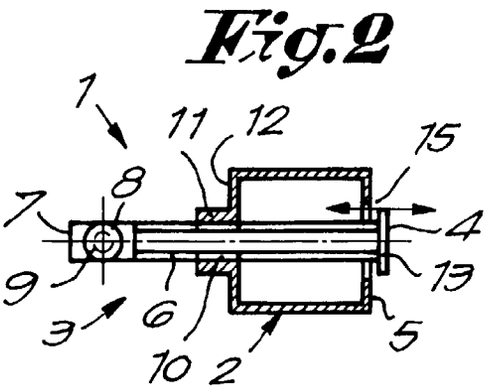


Fig.2

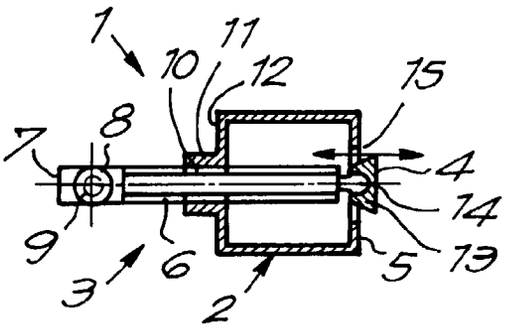


Fig.3

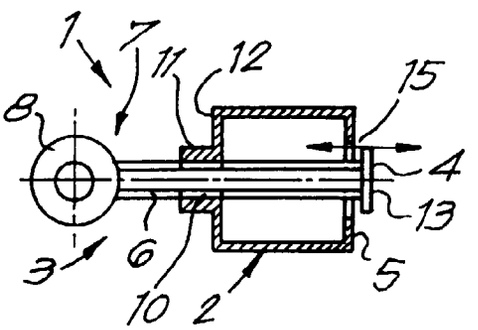


Fig.9

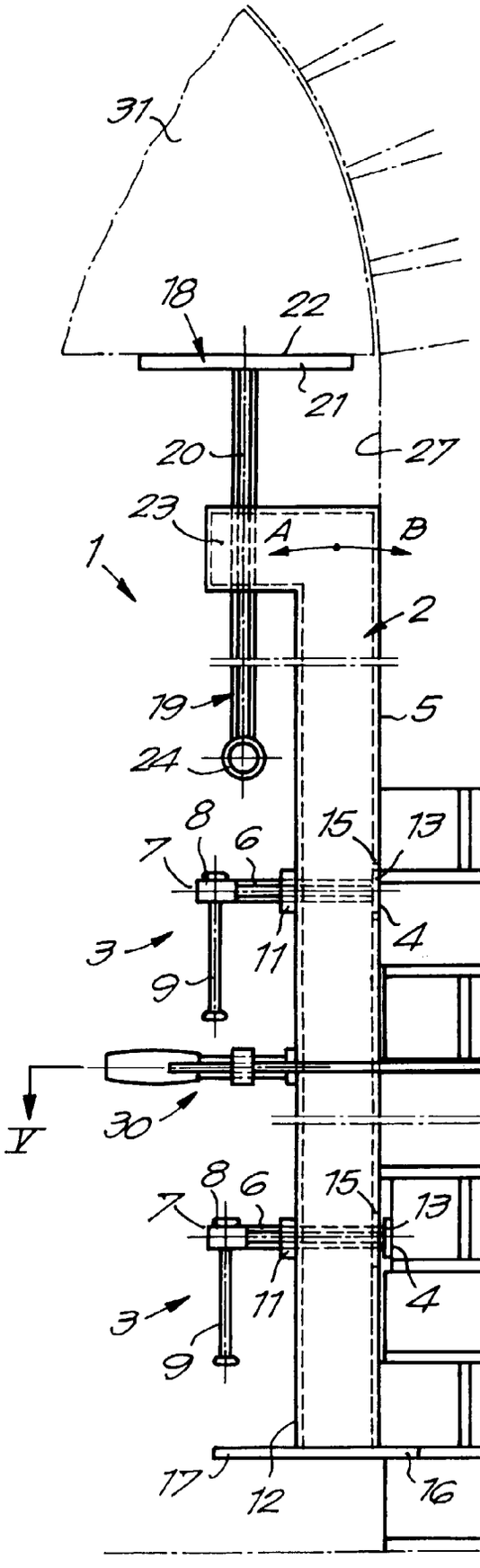

31
18
22
21
20
27
23
A
B
1
2
19
5
24
8
6
7
15
13
4
28
3
11
9
30
V
V
17
12
16
29

Fig.4

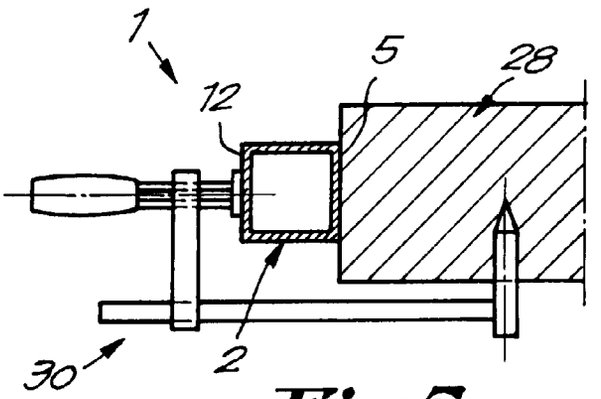

1
12
5
28
30
2

Fig.5

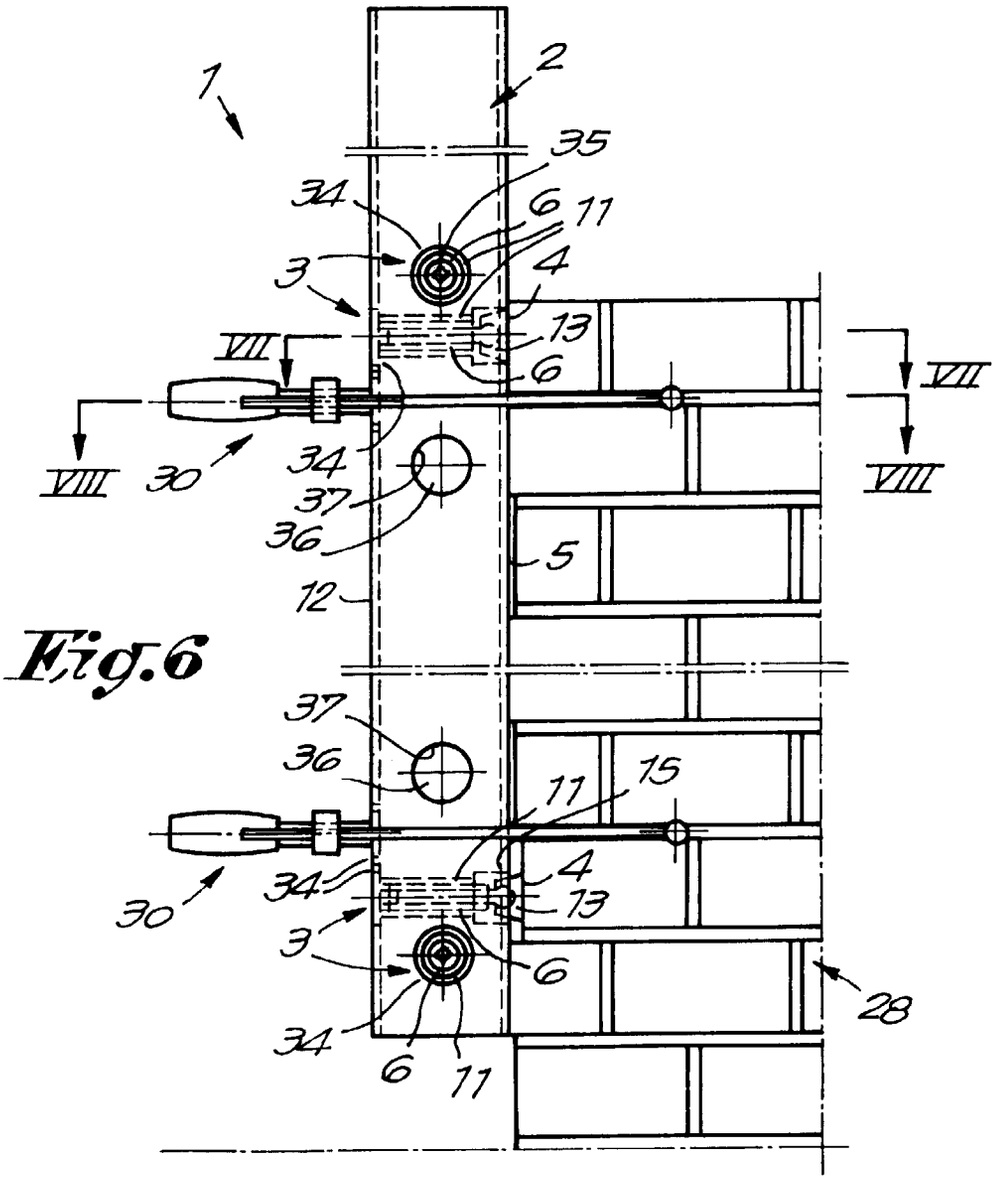


Fig.6

Fig.7

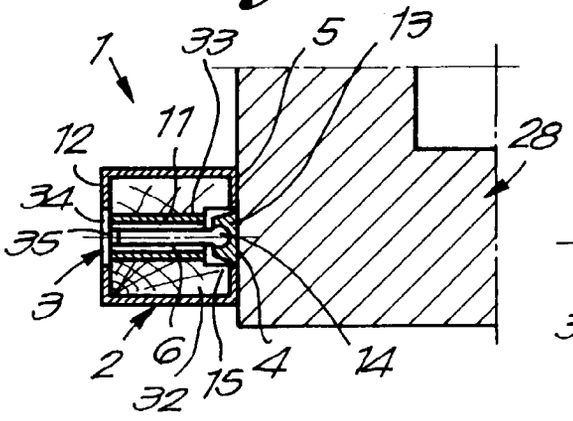
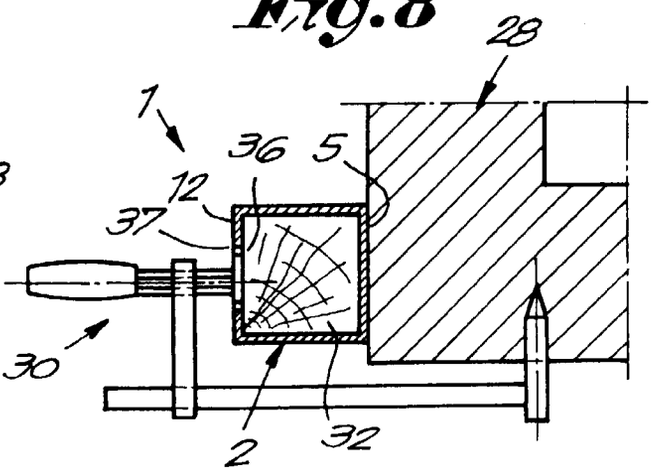


Fig.8



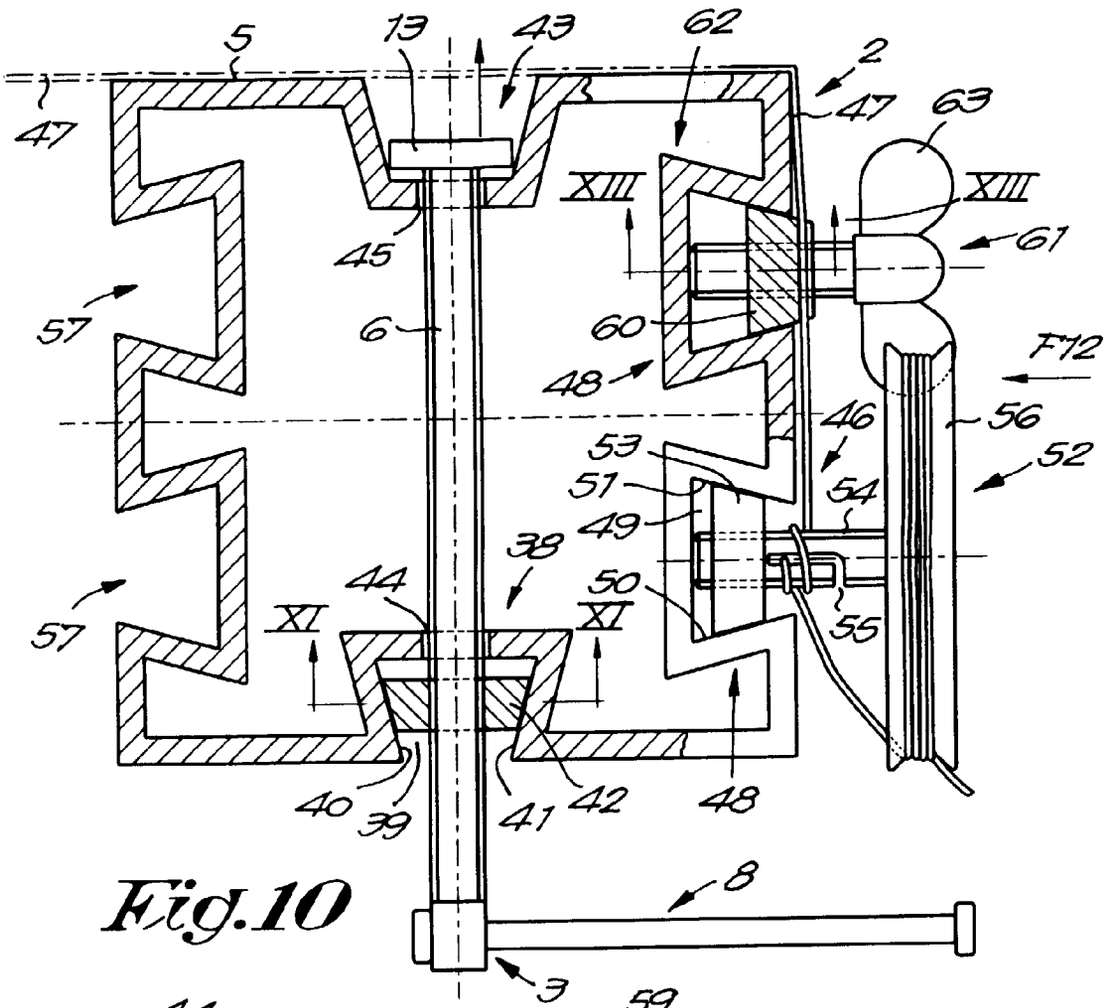


Fig.10

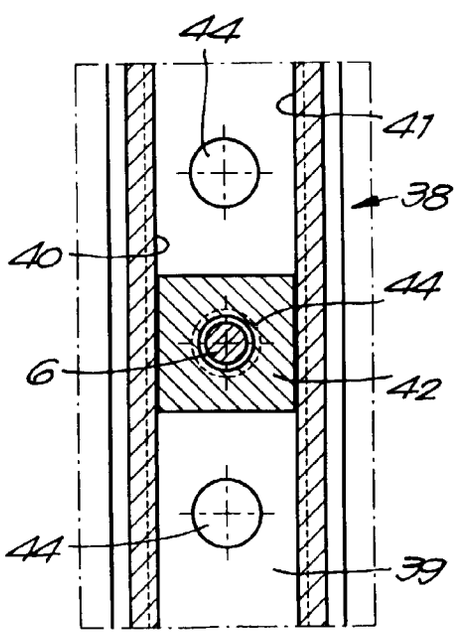


Fig.11

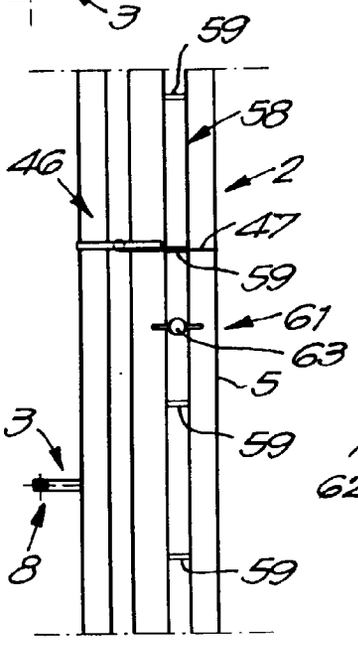


Fig.12

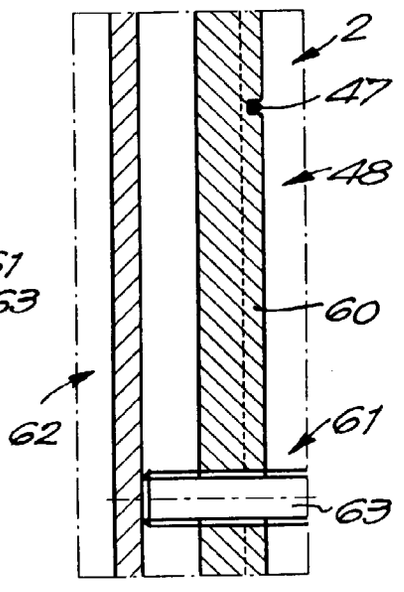


Fig.13

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 20 1219

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	DE 23 28 262 A (RUCKH) * claims; figures *	1-6,9	E04G21/18
X	GB 2 275 292 A (DOUGLAS) * page 5 - page 8; figures *	1-5,9	
X	AU 426 799 B (MACKAY) * page 5, last paragraph - page 9; figures *	1-5	
X	FR 2 021 913 A (DALLA NOGARO) * page 4, line 16 - page 5, line 29; figures *	1-5	
A	DE 93 05 647 U (STEINBRINK) * page 4, line 15 - page 6; figures *	1,16,19, 20,25,26	
A	US 2 623 289 A (KAMPEL) * the whole document *	1,11,12	
A	GB 1 055 072 A (WATES) * page 1, line 80 - page 2, column 4; figures *	1,6-8	TECHNICAL FIELDS SEARCHED (Int.Cl.6) E04G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	15 July 1997	Vijverman, W

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)