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(54) **Extensible grate for protecting the opening of windows and doors**

(57) An extensible grate with ledge for protecting the opening of windows and doors includes transversal bars (2), each of these latter supporting a plurality of vertical uprights (3), having at least an external upright (4), connected to an end of said grate and to which is associated a closing (5), provided with locking members (5a), and having at the remaining end at least a first hinge (6) fit for rotatably connecting the grate (1) to the opening (10)

of the window or door.

The grate (1) includes both extension means (7) telescopically associated to each of the transversal bars (2) in such a way to adapt the width of the grate (1) to the opening (10) to be protected, and at least an extension element (8) telescopically associated to the peripheral upright (4) in such a way to adjust the width of the grate (1) to the opening (10) to be protected.

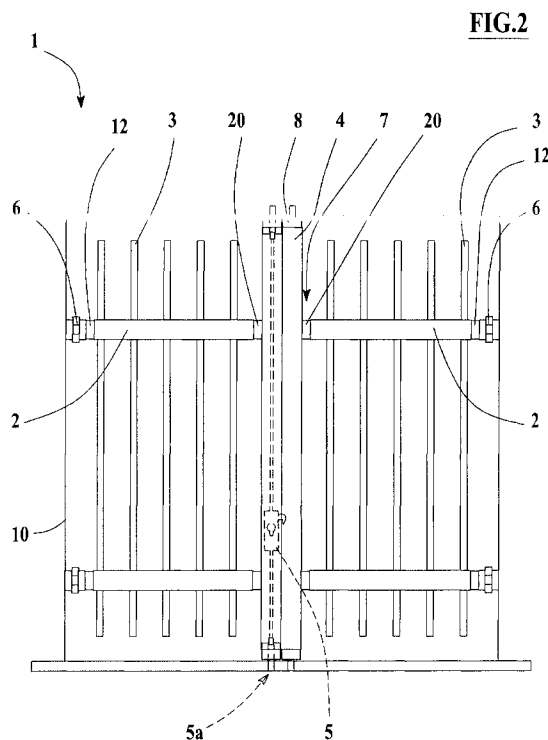


FIG. 2

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Description

[0001] The present invention refers to anti-intrusion protection devices for the openings of the doors or windows or shop-windows, particularly refers to an extensible grate to protect the opening of windows and doors.

[0002] There are known modular grates notes for protecting doors and windows including a series of parallel vertical uprights and almost equally spaced fixed to at least a couple of transversal bars whose ends are provided with fixed protrusions fit to be inserted into tile posts of the windows and doors to be protected.

[0003] These kinds of grates can be extended by inserting, between the fixed protrusions and the ends of the transversal bars, extension modules constituted by vertical uprights fixed to transversal rods connectable to the corresponding horizontal bars so as to extend the grate.

[0004] The main drawback of these kinds of grates or grilles consists in that said modular grille are so-called "fixed-type" and that is the transversal bars of each grate are rigidly fixed to the vertical posts of the related window or door. Although some of said grates could be hinged to a post, in every case the grate width is predetermined because the fitting of one or more extension modules in order to entirely cover the opening to be protected.

[0005] There are also extensible grates that are constituted by a series of vertical uprights to which connecting transversal bars are constrained by means of, for instance, a system of levers for making, with the transversal bars, a four-bar linkage allowing the grate to be "packaged" close to the door or window posts. Such grates have an expensive realization cost because mobile and "packageable" and therefore necessarily strengthened by additional elements fit inside the vertical uprights and made of, especially the mobile transversal bars, very expensive material, such as for instance hardened steel and carbonitrided steel.

[0006] The main purpose of the present invention is to propose a grate allowing the on site change of its dimensions and therefore the fitting to the opening of the windows and the doors to be protected without making at the factory grates made to measure.

[0007] Another object is to propose a grate provided with size regulations both in height and in width by virtue of the uprights and the extensible transversal bars allowing the right grate assembling guaranteeing the coincidence of the lock with the uprights although the opening posts may be out of alignment.

[0008] Further object is to propose a grate of quite cheap and highly safe and reliable.

[0009] The above mentioned objects are achieved according to the claim content.

[0010] The characteristics of the invention are underlined in the following with particular reference to the attached drawings, in which:

- figure 1 show a frontal view of the two shutter grate object of the present invention in . which some inner parts have been hatched and the uprights and the transversal bars are not extended;
- 5 - figure 2 shows the grate of figure 1 in which the uprights and the transversal bars are extended;
- figure 3 shows the grate of figure 1 in which the shutters are centrally put apart;
- 10 - figure 4 shows a view of the grate of figure 1 in which the shutters are constrained to an upper and a lower beam;
- figure 5 shows a view of the grate of figure 3 in which the shutters are constrained to an upper and a lower beam;
- 15 - figure 6 shows a view of the grate of figure 1 whose shutters are articulated;
- figure 7 shows a front view of a shutter hinge;
- figure 8 shows a section view of the hinge of figure 7 according to the plain VIII-VIII;
- 20 - figure 9 shows a partial section view of an extensible block associated with the uprights;
- figure 10 shows an axonometric exploded view of the block of figure 9;
- figure 11 shows an axonometric exploded view of the block of figure 9 in an assembled condition of the grate;
- 25 - figure 12 shows an axonometric exploded view of the extensible block associated with the transversal bars;
- 30 - figure 13 shows a partial section frontal view of the block of figure 12;
- figure 14 shows a partial section top view of the block of figure 13;
- 35 - figure 15 shows an axonometric exploded view of the extensible block interposed between the hinge and the related transversal bar;
- figure 16 shows a partial section frontal view of the extensible block of figure 15;
- figure 17 shows a top view of the section of figure 16;
- 40 - figure 18 shows a view of the grate of figure 1 made for protecting a door opening;
- figure 19 shows a partial axonometric schematic view of the closure stop of the one shutter grate of figure 1.
- 45

[0011] With reference to figures from 1 to 6, numeral 1 indicates an extensible grate with ledge to protect the window or door openings essentially including transversal bars 2, vertical uprights 3, at least one 4 of which is external, a closure 5, locking members 5a, extension means 7 and two extension elements 8.

[0012] The grate 1 is constituted by two shutters closed and hinged to the shoulders of an opening 10 of the related window or door. In the following it will be principally described only one shutter because the two shutters are equal and positioned lined up in their closing condition C, with the exception of the presence of only

one closure 5 in the case of close shutters and whose external uprights almost interfere.

[0013] Each shutter has two parallel transversal bars 2 to which a plurality of parallel and equally spaced uprights 3 are perpendicularly welded and whose number depends on the opening to protect, for instance varying from 2 to 8.

[0014] Each shutter of the grate 1 is rotatably fixed to a shoulder of the opening 10 in correspondence of the ends of the transversal bars 2 by means of a first hinge 6.

[0015] With particular reference to the figures from 15 to 17, the extension means 7 associated to the end of each transversal bar 2 hinged to the opening 10 include a first block 12 that is interposed between the end of said bar and the first hinge 6 and is constituted by an internal portion 12a slidably housed inside the transversal bar 2 and by a hollow portion 12b external to said bar.

[0016] The first block 12 is provided with a plurality of threaded holes 13, engaged by corresponding grub screw 14 fit to space the internal portion 12a from a plate 15 fixed inside the transversal bar 2 for instance by means of welded joints 42 or rivets.

[0017] The internal portion 12a of the block 12 has a through hole 16 crossed by locking means 17, for instance a screw, whose threaded end is fit in a corresponding threaded hole of the plate 15 and whose head 17a locks the hinge 6 against the hollow portion 12b in such a way to constrain this latter to a predefined distance from the transversal bar 2.

[0018] The hinge 6 is provided with protrusions 18 lying on the surface of the hinge 6 in front of the hollow portion 12b of the first block 12 and fit in this latter in order to avoid the mutual rotation between the block and said hinge.

[0019] With particular reference to the figures from 12 to 14, in correspondence of the remaining end of each transversal bar the extension means 7 are constituted besides by a second block 20 that is interposed between the end of the transversal bar 2 and the external upright 4 and that has a first plurality of threaded holes 21, engaged by corresponding grub screws 22 fit to space the second block 20 from a stop 23 fixed inside the transversal bar 2, for instance by means of welded joints 43.

[0020] Furthermore, the second block 20 has a plurality of through holes 24 crossed by the rod of clamping screws 25 whose threaded ends engage corresponding threaded holes carried out in the stop 23 and whose heads 25a mate the inner wall 4a of the external upright 4 so fixing this latter to the related transversal bar 2.

[0021] It is advantageous to underline that the extension means 7 are telescopically associated to each transversal bars 2 in such a way to adjust the width of the grate 1 to the opening 10 to be protected.

[0022] With particular reference to the figures 9-11, to each end of an external upright 4 of a grate 1 shutter is slidably fixed the extension element 8 that is internally provided with a bushing 8a crossed by the locking members 5a and is fixed to the external upright 4 by screw

means 28 passing through a slot 29 carried out in the side wall of said upright.

[0023] The locking members 5a are connected to the closing 5, housed inside the external upright 4. Each locking members includes a rod 30, which is axially positioned inside the external upright 4, and which is fixed to a spacer 31 in correspondence of its end.

[0024] To the free end of said spacer is screwed a headless screw 32 to whose remaining end is screwed a pawl 33 having an axial excursion by screwing or unscrewing said screw.

[0025] The pawl 33 is provided with an axial threaded hole 34 in which a grub screw 35 is engaged having a tip 35a directed toward the pawl 33 and inserted into the pawl head in order to avoid its rotation with respect to the headless screw 32.

[0026] The installation of the grate 1 provides the adjustment of the width and height grate dimensions by using and adjusting the extension means 7, associated to the transversal bars, and the adjustment of the extension elements 8 housed in the external uprights.

[0027] The operator regulates the length of the transversal bars 2 by rotating, screwing or unscrewing, the grub screws 14 whose free ends mate the plate 15 and determine the distance between this latter and the first block 12. After the adjustment, the protrusions 18 of the hinge 6 are inserted in the hollow portion 12b of the first block 12 and the screw 17 is screwed to the plate 15 locking the hinge 6 to the transversal bar 2 by compressing the head 17a of the screw 17 against said hinge which cannot rotate because of the engagement between the protrusions 18 and the inside edge of the hollow portion 12b of the first block 12.

[0028] In the same way, the distance of the second block 20 from the stop 23 is adjusted by screwing/unscrewing the grub screws 22, while the lock of the transversal bar 2 to the external upright 4 is made by clamping the screws 25 whose head compresses an inside wall of the external upright 4 against the second block 20.

[0029] The access to the heads of the screws 25 and grub screws 22 is allowed by means of corresponding holes 44 and 45, carried out on the sidewall opposite to the inside wall engaged by the screws 25.

[0030] The adjustment of each locking members 5a is done by previously screwing the headless screw 32 into the spacer 31 and fixing, for instance by means of adhesive, and then screwing or unscrewing the pawl 33 on the headless screw 32 so causing respectively the shortening or the extension of the end of the relative rod 30.

[0031] The clamping of the grub screw 35 to the end of the headless screw 32 effects the rotation lock of the pawl 33.

[0032] The operator provides therefore to adjust each extension element 8 of the relative external upright 4 by positioning at desired height said extension element and fixing this latter to the upright by tightening the screw 28.

[0033] In the preferred embodiment, the grate 1 is constituted by a couple of shutters in which an external uprights 4 only has the closing 5 provided with a hook 47 suitable for hooking the upright 4 of the other shutter.

[0034] A variant of the grate 1 is shown in figures 4 and 5 and provides the use of a cross-bar 9, upper and/or lower, whose ends are fixed to the shoulders of the opening 10 to be protected, for instance by means of a couple of wedges 46. Each of said cross-bar 9 is positioned at the outside of the grate 1, nearly parallel to the transversal bars 2 so that the pawl 33 of the locking members 5a is engaged in a related hole of the cross-bar 9 in correspondence of a closing condition C of the grate 1.

[0035] In the figures 3 and 5, two variants of the grate 1 are shown which is constituted by a couple of shutters having the same external uprights 4, that is provided with the extension element 8 and the locking means 5a so that it is possible to install the couple of shutters with the external uprights 4 spaced. Said grate variant provides the use of a couple of closings 5, without the hook 47.

[0036] In particular the figure 5 shows a combination of the two preceding variants.

[0037] Another variant of the grate 1, shown in the figures from 6 to 8, provides the use of a second hinge 11 interposed between the first hinge 6 and the peripheral upright 4 in such a way to allow 1 the opening of the grate 1 at around 180° beyond the shoulder of the opening 10 in order to open the grate 1 above possible casings external to said grate.

[0038] The second hinge 11 has a first plate 11a having both a series of protrusion 40 fit to engage the inside edge of the transversal bar 2 in order to avoid the rotation of the second hinge 11, and a central hole 41 crossed by the rod of a screw 36 fit to engage with a first small plate 38 fixed inside said transversal bar 2, for instance by means of welded joints or rivets.

[0039] The second hinge 11 further provides a second plate 11b having two holes 41 crossed by the rods of related screws 37 whose ends are engaged with a second small plate 39, fixed by means of welded joints or rivets, in order to lock the second plate 11b to the transversal bar 2.

[0040] It is also advantageous underlining that the grate 1 can have another variant constituted by a grate suitable to protect the opening 10 of a door in which, as shown in figure 18 for instance, the transversal bars 2 are three instead of two and are equally spaced.

[0041] During the installation of the grate 1, it is advantageous underlining that the operator can screw the grub screw 35 with the tip 35a directed toward the cross-bar of the opening 10 so that, in correspondence of the closing condition C of the grate 1 and the activation of the closing 5, so activating the blocking means 5a, the tip 35a marks the precise point in which it is necessary to make the housing hole of the pawl 33.

[0042] It is important to underline that using said grate

it is possible to adjust the grate dimensions and also to compensate the skews of the opening 10 by means of the asymmetrical and suitable adjustment of each single extension mean 7 or extension element 8 or locking means 5a.

[0043] For instance the second block 20 has an axial dimension of 35 mm and the relative grub screws 14 and 22 are 70 mm long, so that it is possible to obtain a width excursion of the two shutters from 1200 mm to 1390 mm.

[0044] The first block 12 has varying axial dimensions, for instance, from 30 to 80 mm with regard to the opening 10 to be protected.

[0045] A further variant, shown in figure 19, provides the use of the single shutter grate 1 in which the closing 5 has a stop 50, constituted by a plate 51, provided with two holes 56 to which a hollow block 52 is fixed, this latter having a slot 53, in which the hook 47 is engaged, in the closing condition C.

[0046] Said stop 50 provides besides a further hole 54 through which a screw 55 passes for fixing the plate 51 to the shoulder of the opening 10. A further screw 55 passes through the slot 53 to cooperate for fixing the plate 51 so completely compressing the head of the screws 55 against the edge of the corresponding holes 56.

[0047] The stop 50 allows to maintain spaced the external upright 4 from the shoulder of the opening 10 for allowing an easier opening of said grate and an easier installation and for avoiding the possible friction of the upright 4 against the shoulder of said opening.

[0048] For all the variants of the grate above described, the grate operational adjustments are the same described for the preferred embodiment or for the variant suitable to protect the doors.

[0049] The main advantage of the present invention is to provide a grate allowing the adjustment during the installation of its dimensions in width and height and therefore the fitting to the opening of the windows and the doors to be protected, without carrying out grates to measure.

[0050] Further advantage is to provide a grate fit to be assembled so guaranteeing the coincidence of the lock with the uprights although the posts of the opening to be protected may be out of alignment.

[0051] Further advantage of the present invention is to provide a grate having a simple realization, high reliability and safety and easy installation.

Claims

1. Extensible grate for protecting the opening of windows or doors including transversal bars (2) each of these latter supporting a plurality of vertical uprights (3), having at least an external upright (4), connected to an end of said grate and to which is associated a closing (5), provided with locking

members (5a), and having at the remaining end at least a first hinge (6) fit for rotatably connecting the grate (1) to the opening (10) of the window or door, the grate (1) being characterized in that includes:

- extension means (7) telescopically associated to each transversal bars (2) so as to fit the width of the grate (1) to the opening (10) to be protected;
- at least an extension element (8) telescopically associated to the external upright (4) in such a way to adjust the width of the grate (1) to the opening to be protected.

2. Grate according to claim 1 characterized in that said extension means (7) include a first block (12) interposed between the end of the transversal bar (2) and the first hinge (6) and constituted with an inside portion (12a) slidably housed inside the transversal bar (2) and with an hollow portion (12b) and external to this latter, with the first block (12) provided with a plurality of threaded holes (13), engaged by corresponding grub screws (14) fit to space the inside portion (12a) from a plate (15) fixed inside the transversal bar (2), and with through hole (16), crossed by locking means (17), whose threaded end engages a corresponding threaded hole of the plate (15) and whose head (17a) lock the hinge (6) against the hollow portion (12b) in such a way to constrain said hinge (6) to a predefined distance from the transversal bar (2).
3. Grate according to claim 2 characterized in that the hinge (6) is provided with protrusions (18) positioned on the surface of the hinge (6) facing the first block (12) and fit into this latter in order to avoid the mutual rotation between said first block and said hinge.
4. Grate according to claim 1 or claim 2 characterized in that said extension means (7) further include a second block (20) interposed between the end of the transversal bar (2) and the external upright (4) and having both a first plurality of threaded holes (21), engaged by corresponding grub screws (22) fit to space the second block (20) from a stop (23), fixed inside the transversal bar (2), and a plurality of through holes (24), crossed by clamping screws (25) whose threaded ends are engaged in corresponding threaded holes of the stop (23) and whose heads (25a) lock the external upright (4) to the transversal bar (2).
5. Grate according to claim 1 characterized in that the extension element (8), provided with a bushing (8a) crossed by the locking members (5a), is fixed to said external upright (4) by screw means (28) passing through a slot (29) carried out in the side wall of

the same upright.

6. Grate according to claim 1 characterized in that the locking members (5a) include essentially at least a rod (30) to whose ends a spacer (31) is fixed, to whose free end it is hinged a headless screw (32) to which is constrained a pawl (33) having an axial excursion.
7. Grate according to claim 6 characterized in that said pawl (33) is provided with a threaded axial hole (34) in which a grub screw (35) is engaged.
8. Grate according to claim 7 characterized in that said grub screw (35) has a tip (35a) inserted into the head of the pawl (33) in order to avoid its rotation with respect to the headless screw (32).
9. Grate according to claim 7 characterized in that the grub screw (35) has a tip (35a) inserted into the opening (10) in correspondence of a closing condition (C) of the grate (1).
10. Grate according to anyone of the preceding claims characterized in that further includes at least a cross-bar (9) whose ends are fixed to the shoulders of the opening (10) to be protected and is positioned outside the grate (1), almost parallelly to the transversal bars (2) in such a way that the locking members (5a) engage the transversal bars (2) in correspondence of a closing condition (C) of the grate (1).
11. Grate according to anyone of the preceding claims characterized in that is constituted by a couple of shutters having spaced external uprights (4).
12. Grate according to anyone of the preceding claims characterized in that further includes a second hinge (11) interposed between the first hinge (6) and the external upright (4) so allowing the opening of the grate (1) at about 180° over the shoulder of the opening (10).
13. Grate according to claim 12 characterized in that the second hinge (11) has a first plate (11a) having both a series of protrusions (40) fit to mate the internal edge of the transversal bar (2) for avoiding the rotation of the second hinge (11), and a central hole (41) crossed by the rod of a screw (36) engaging a first small plate (38) fixed inside said transversal bar (2), said second hinge (11) being further provided with a second plate (11b) having two holes (41) crossed by the rods of related screws (37) whose ends engage a second small plate (39) for locking the second plate (11b) to said transversal bar (2).

14. Grate according to anyone of the preceding claims characterized in that the transversal bars (2) are three.

15. Grate according to anyone of the preceding claims characterized in that the grate (1) has a single shutter and the closing (5) has a hook (47) and a stop (50) fixed to the shoulder of the opening (10) and constituted by a plate (51) to which a hollow block (52) is fixed, having a slot (53) engaging the hook (47) in correspondence of a closing condition (C) of the grate (1).

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FIG.1

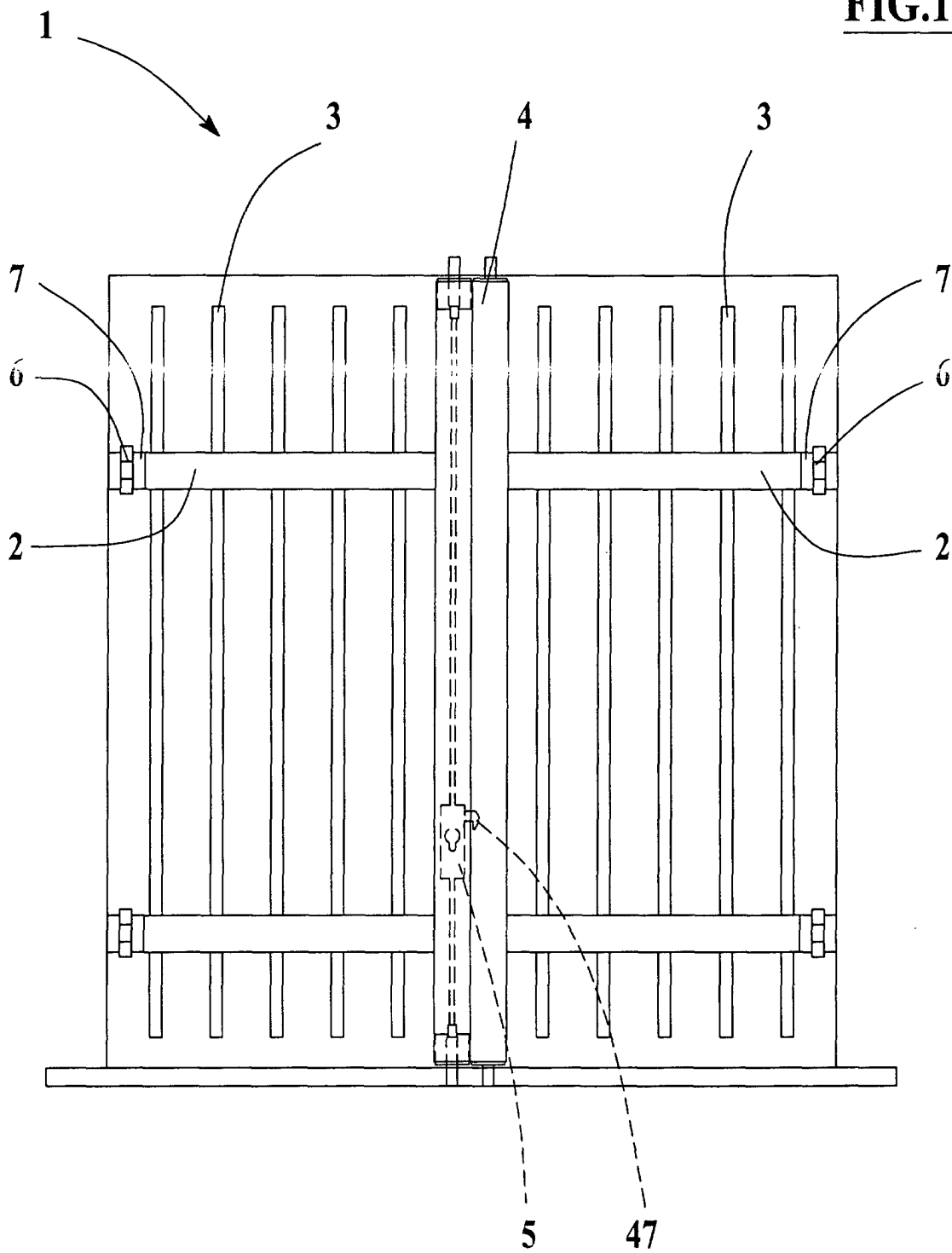


FIG.2

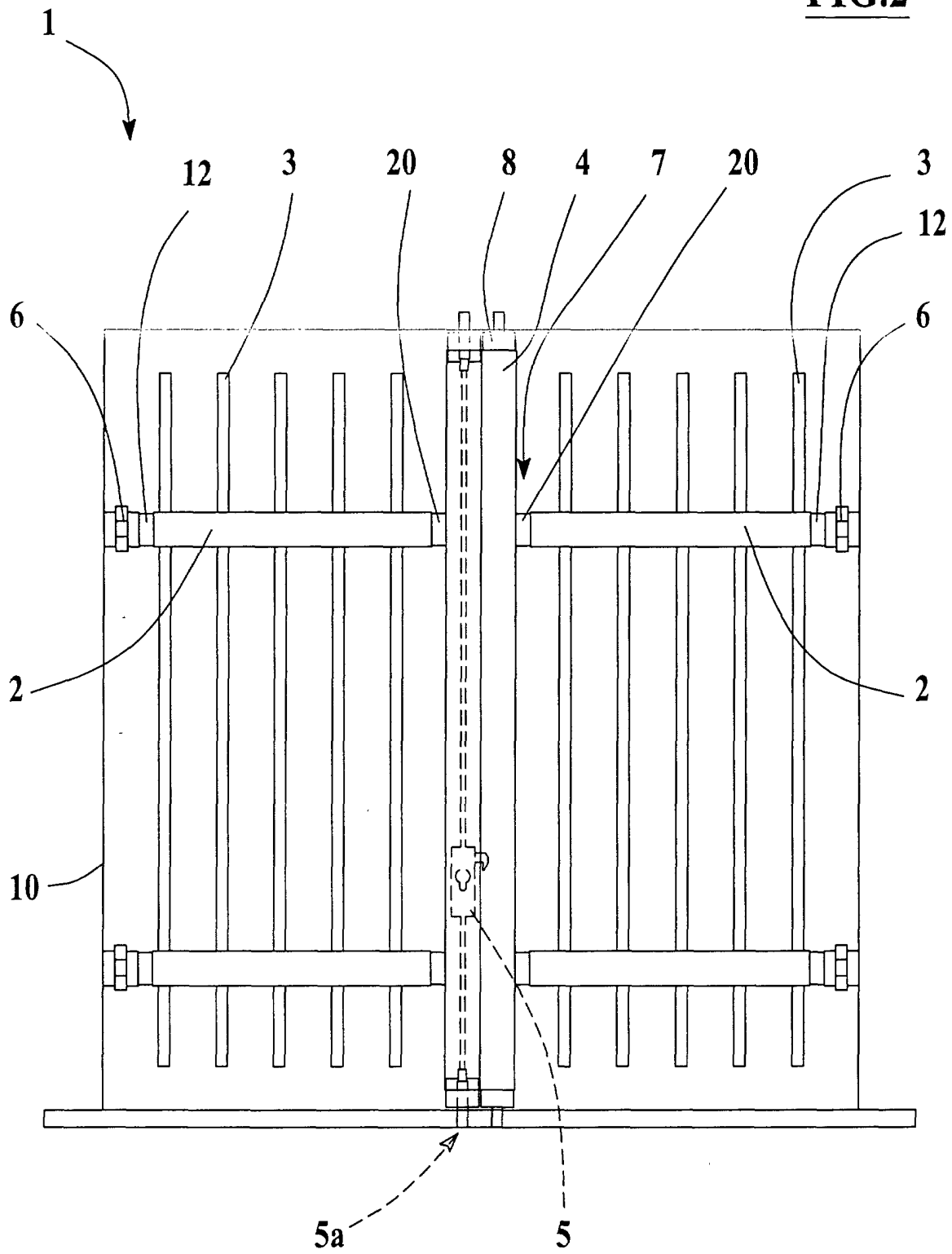


FIG.3

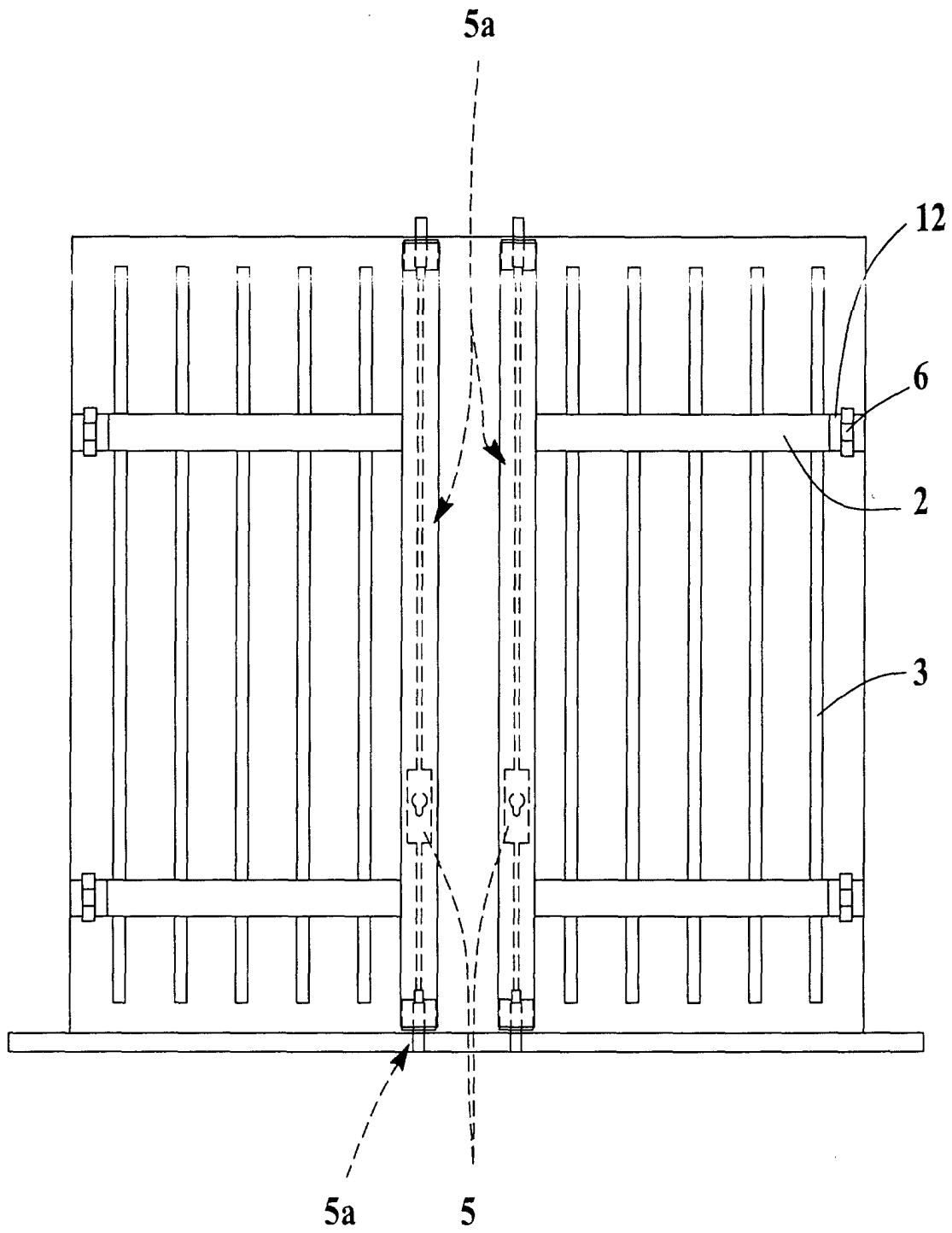


FIG.4

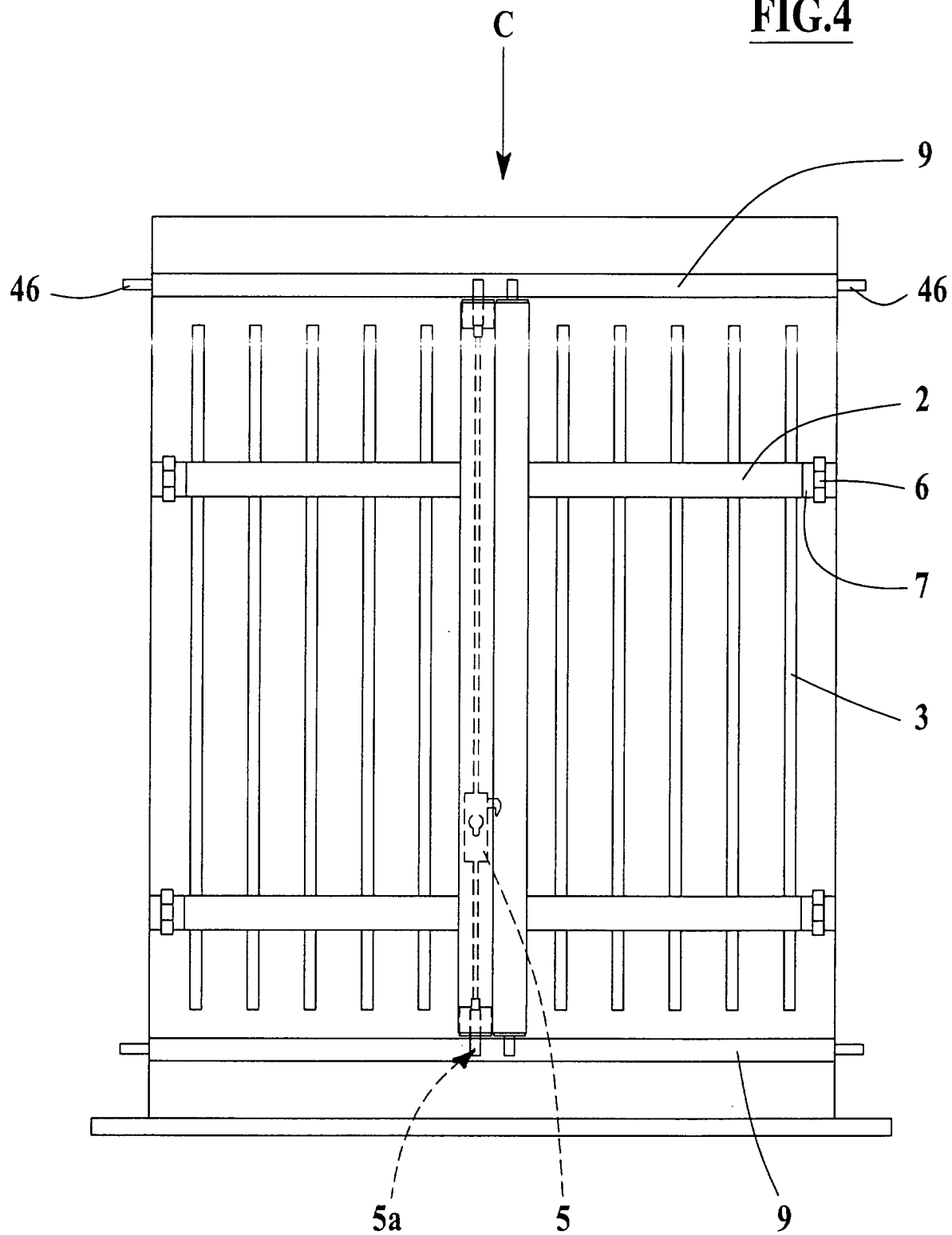


FIG.5

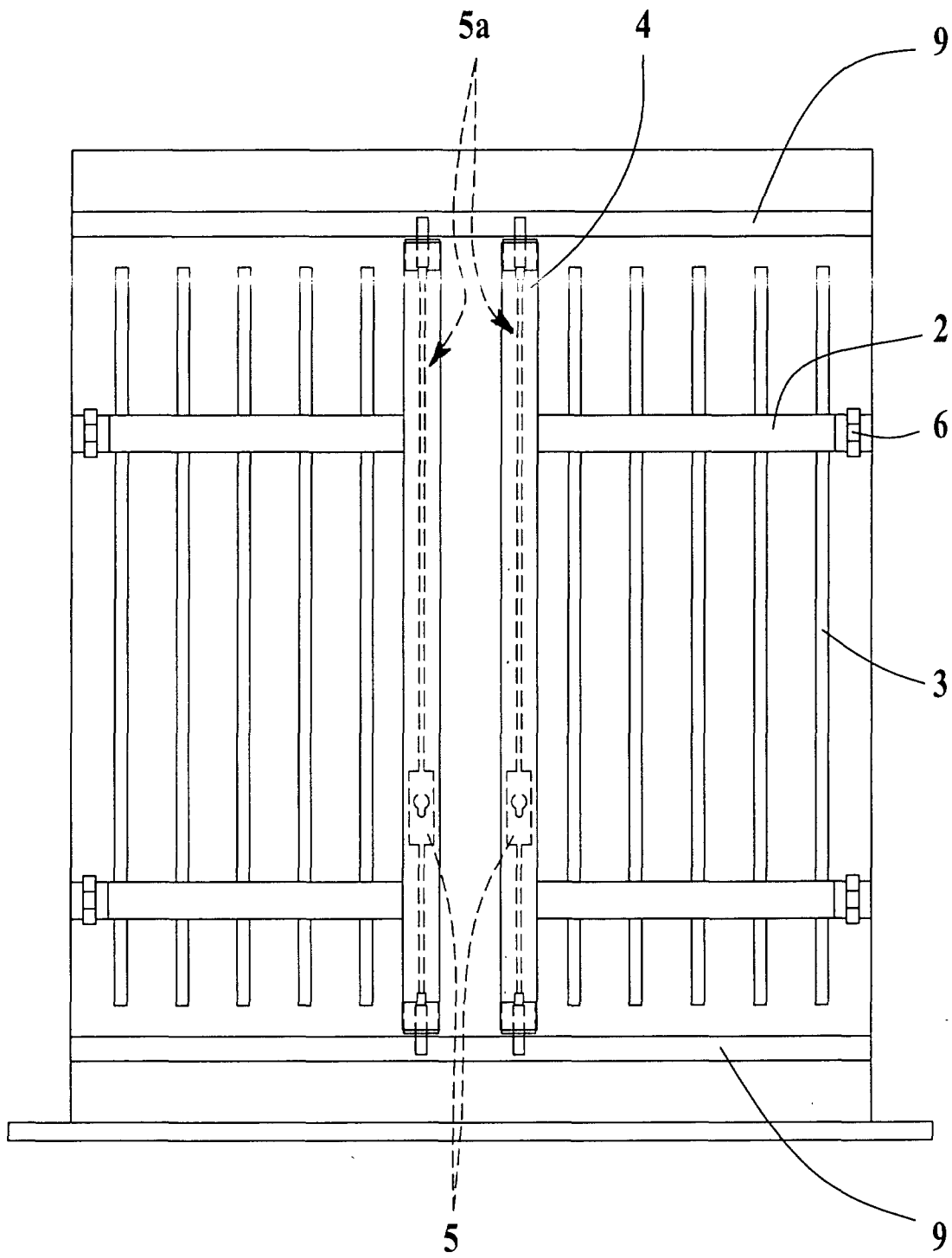
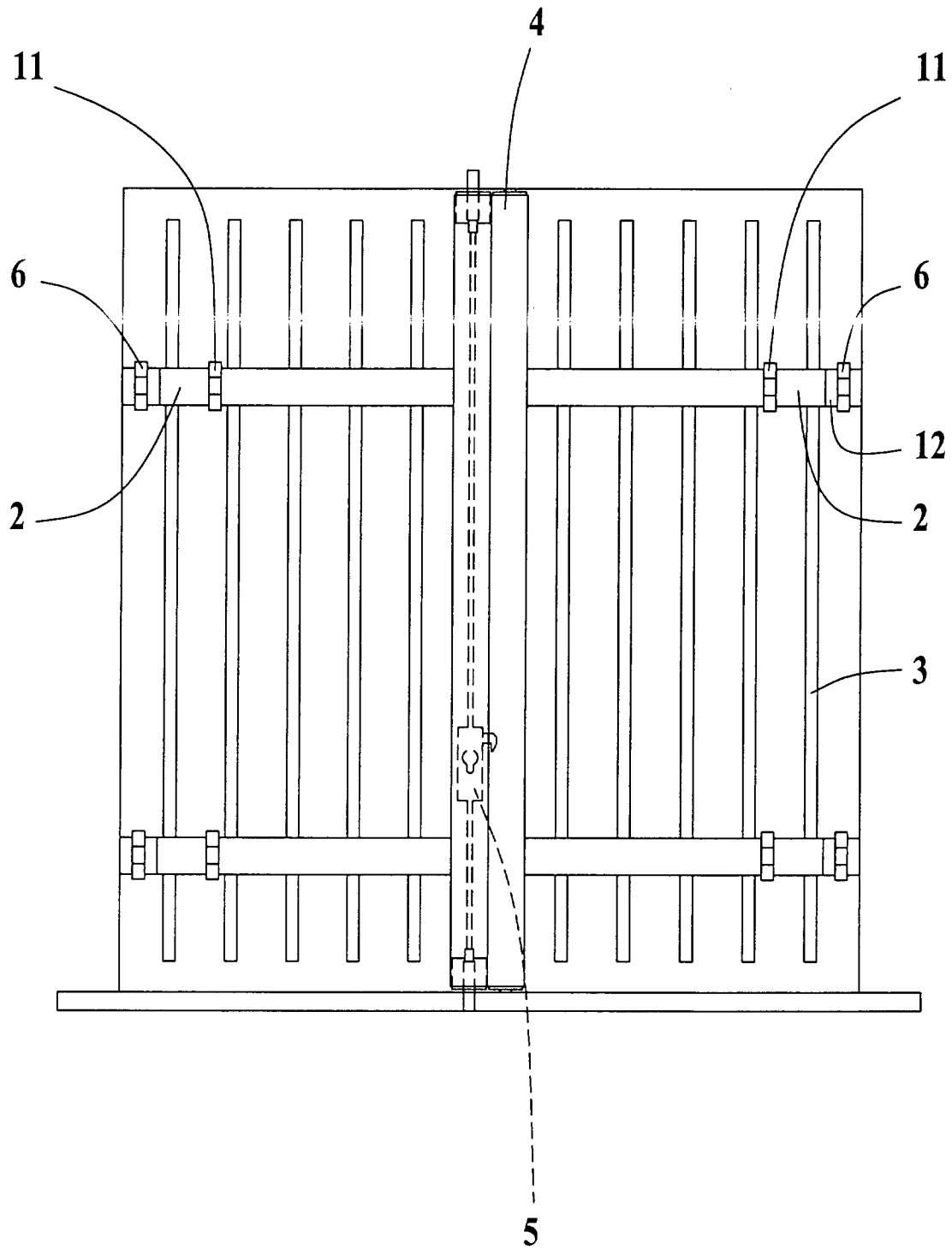


FIG.6



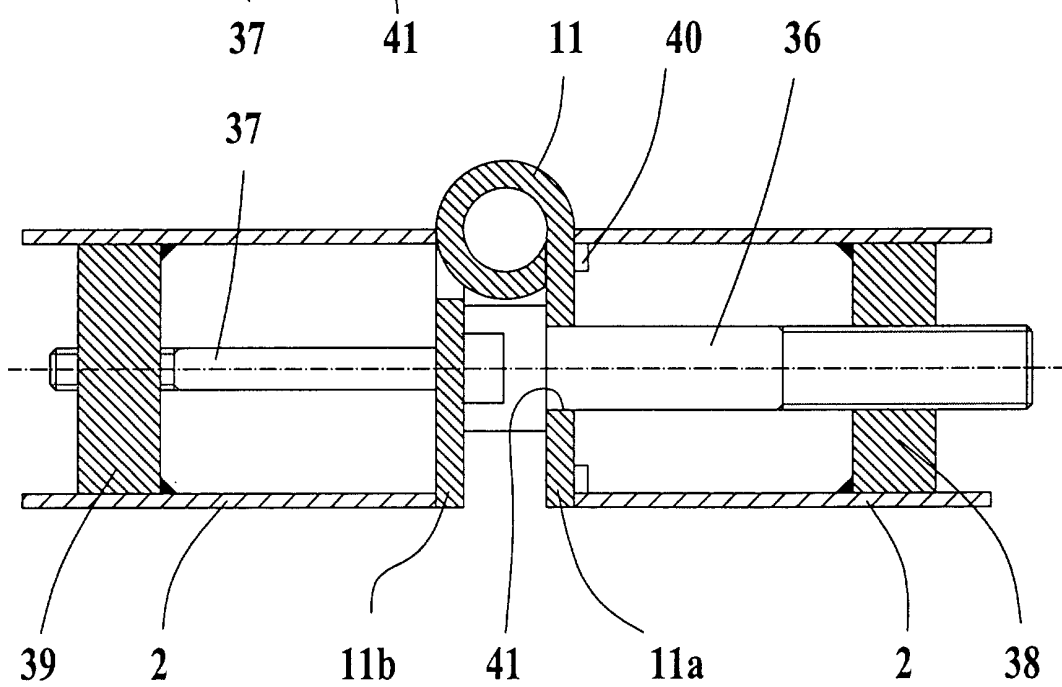
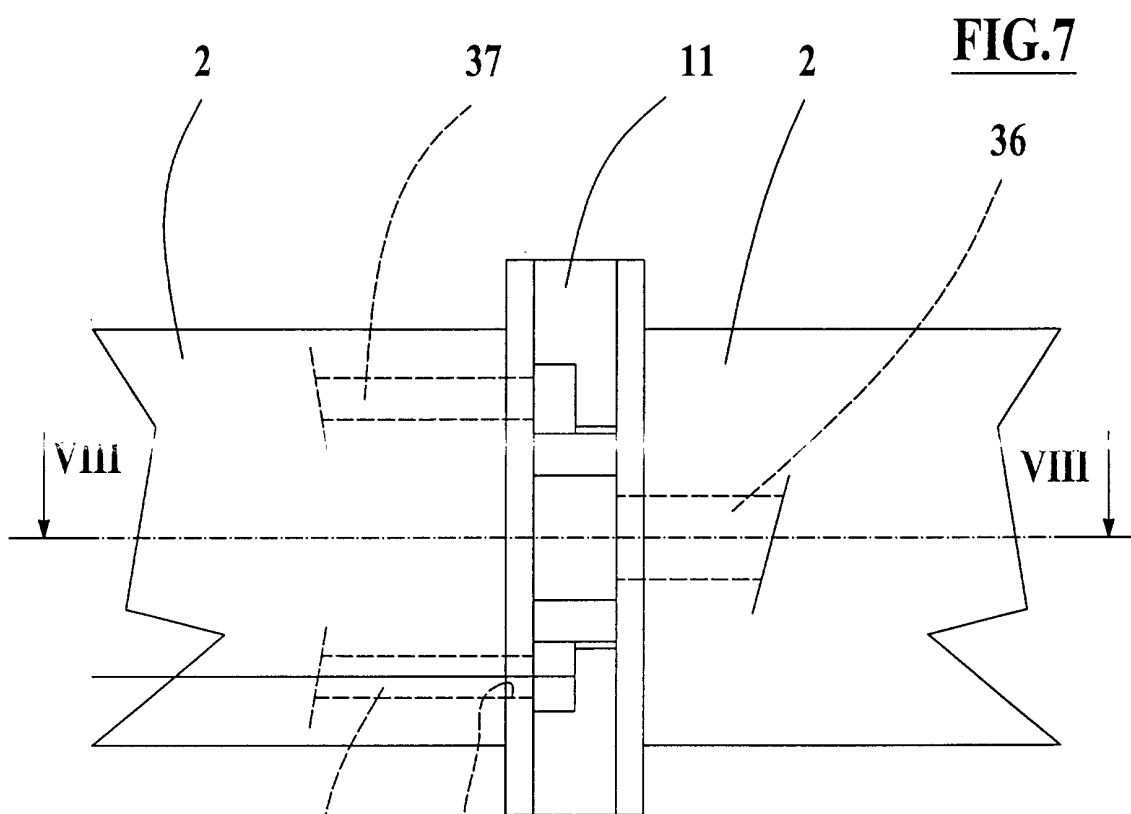


FIG.8

FIG.9

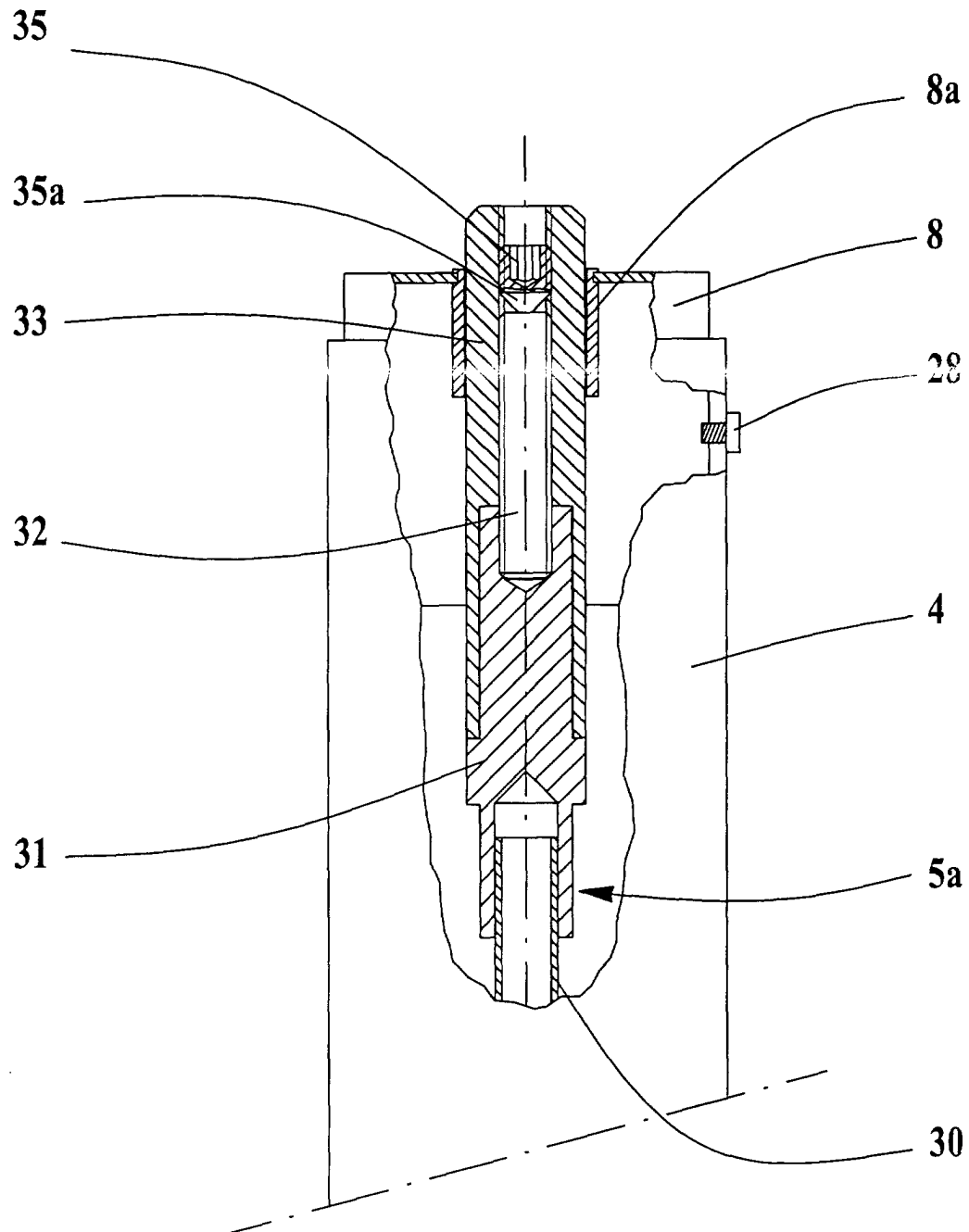


FIG.10

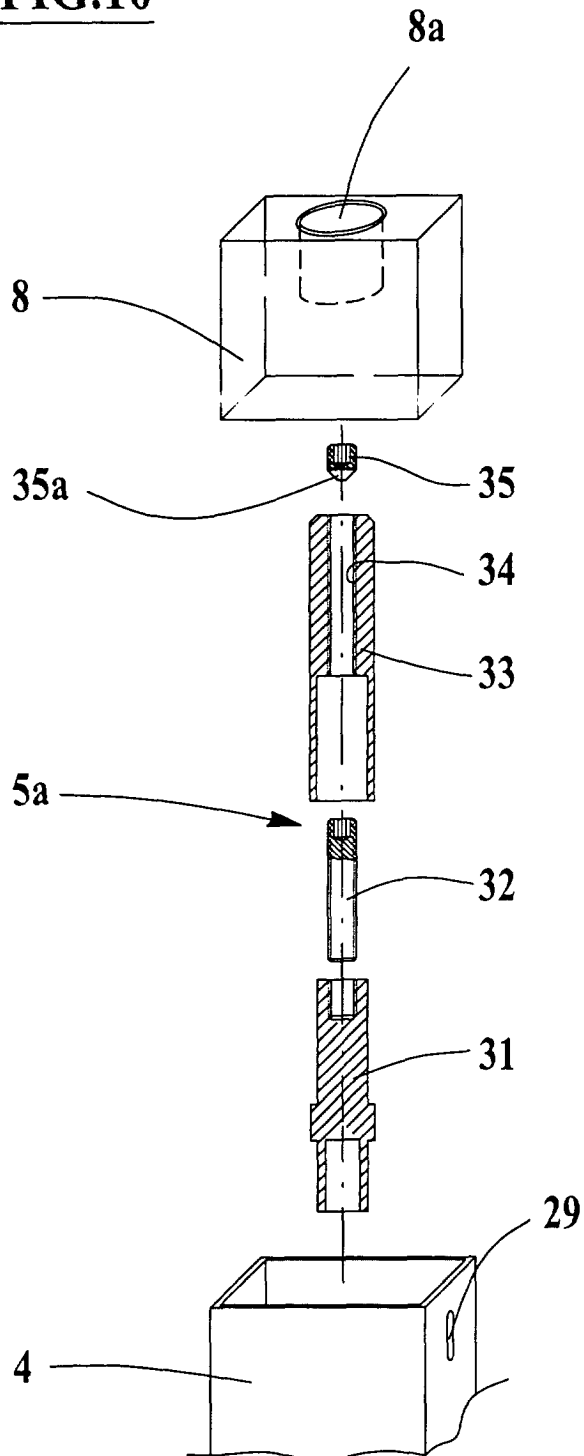


FIG.11

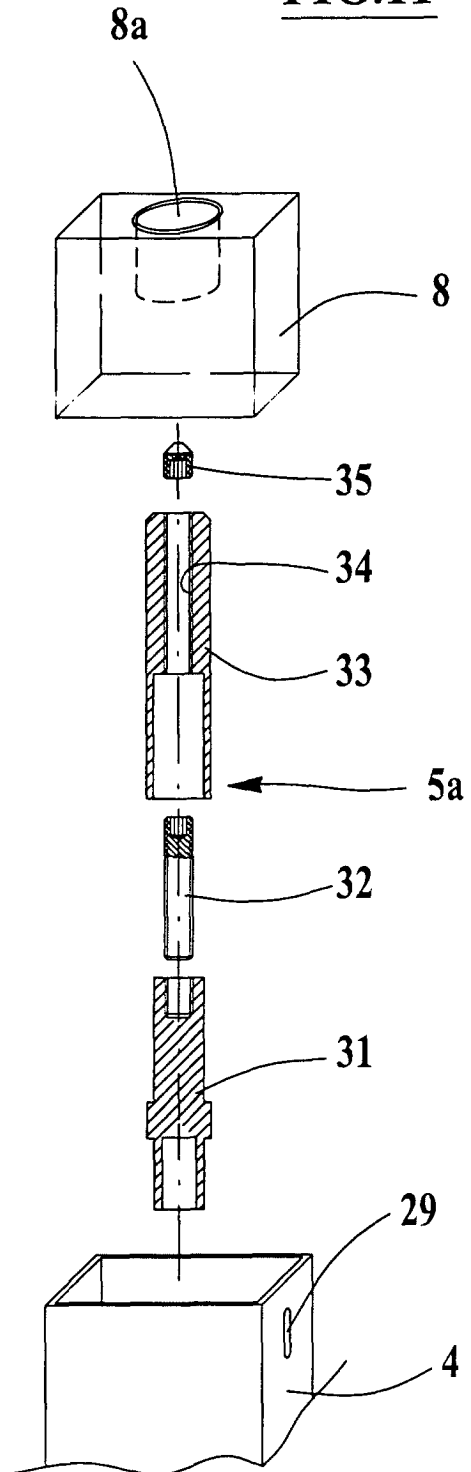


FIG.12

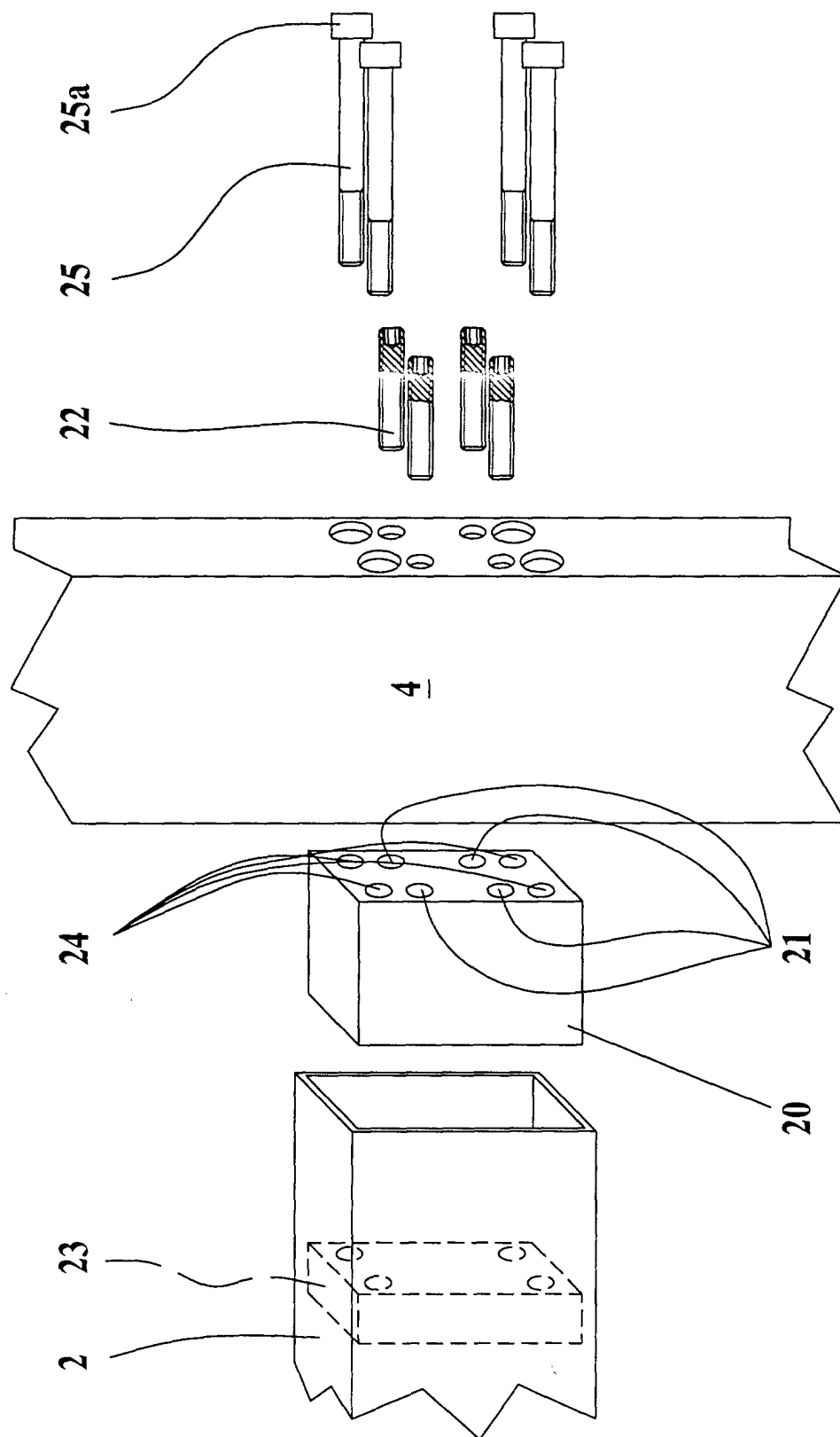


FIG.13

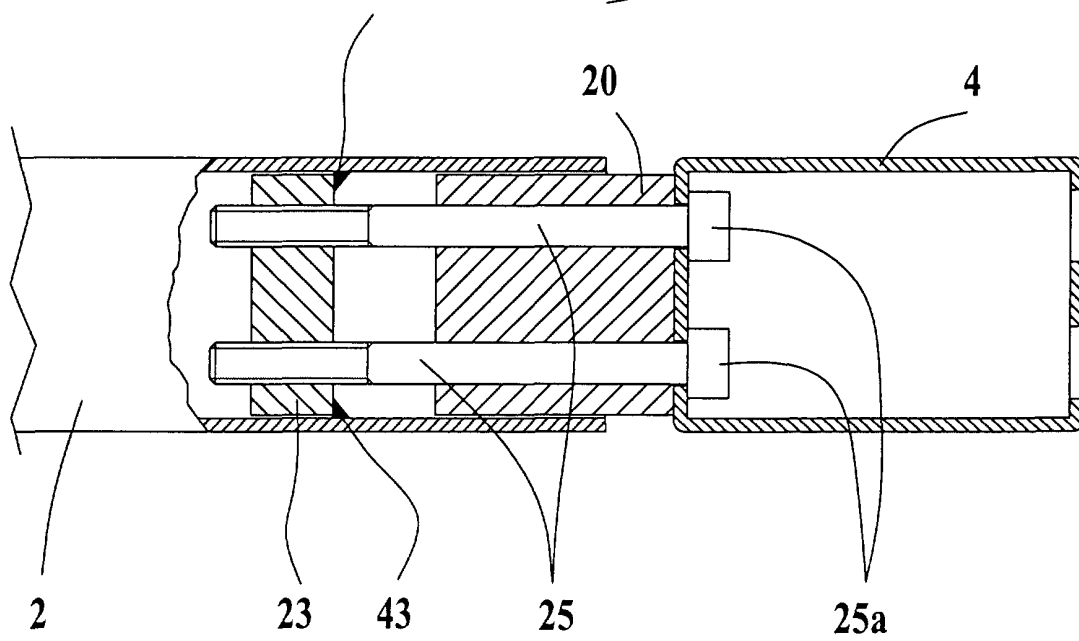
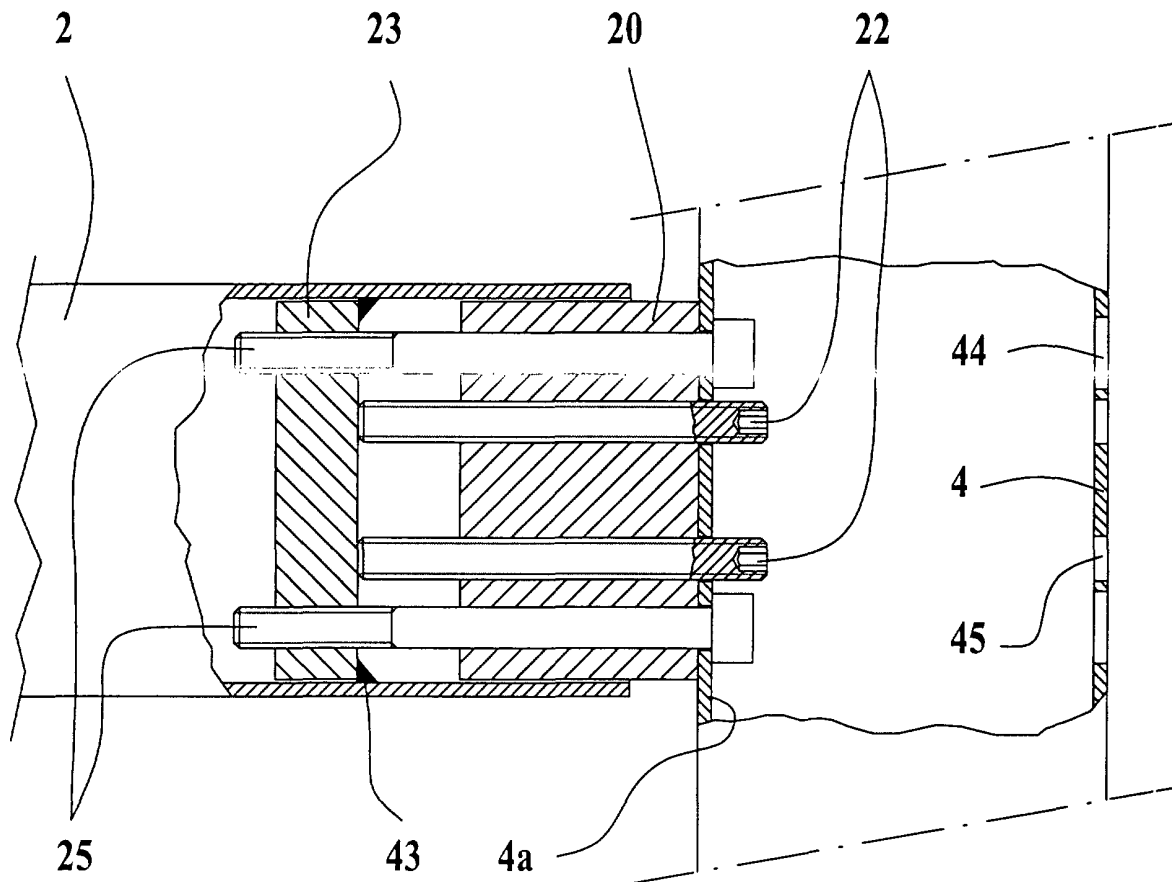
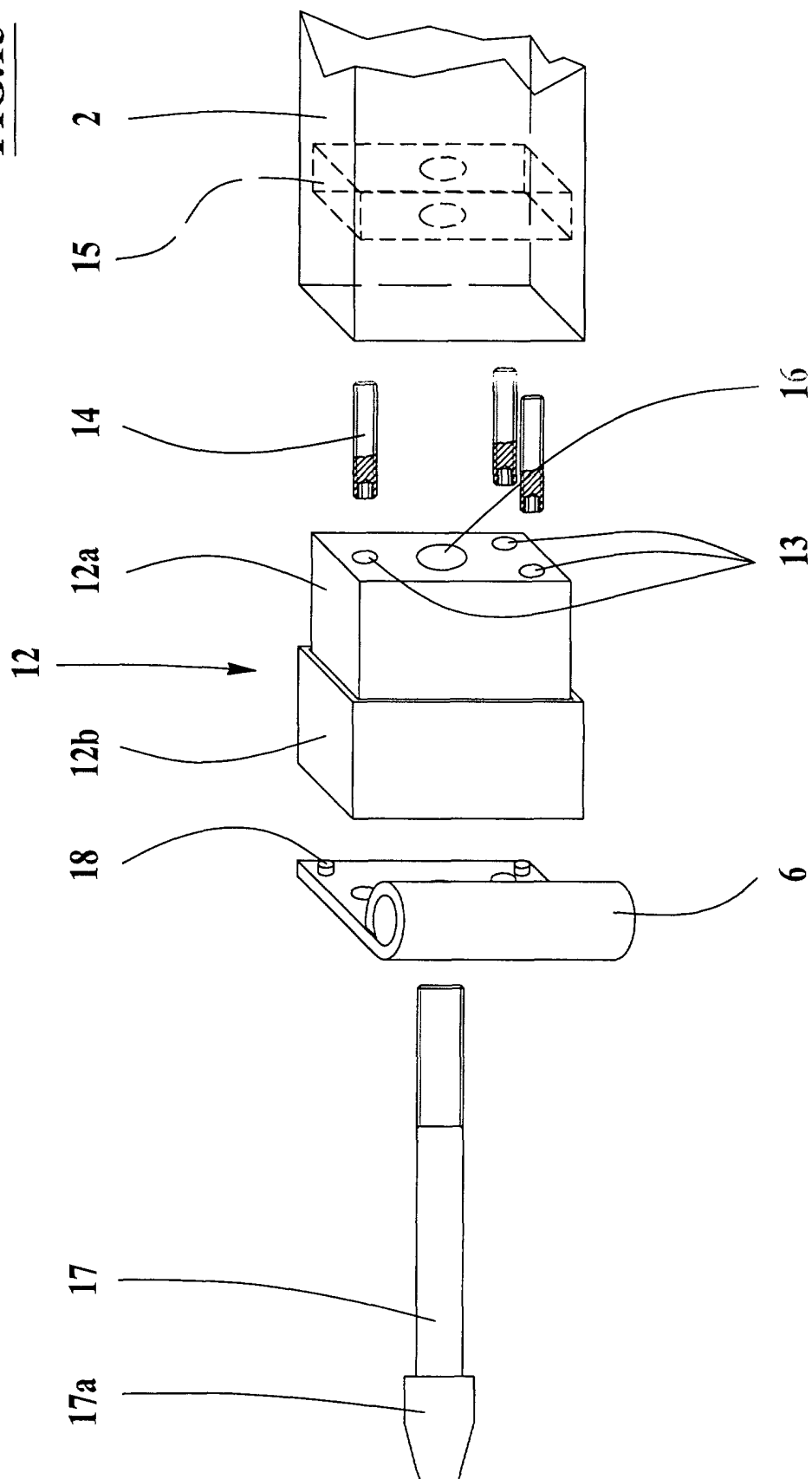


FIG.14

FIG.15



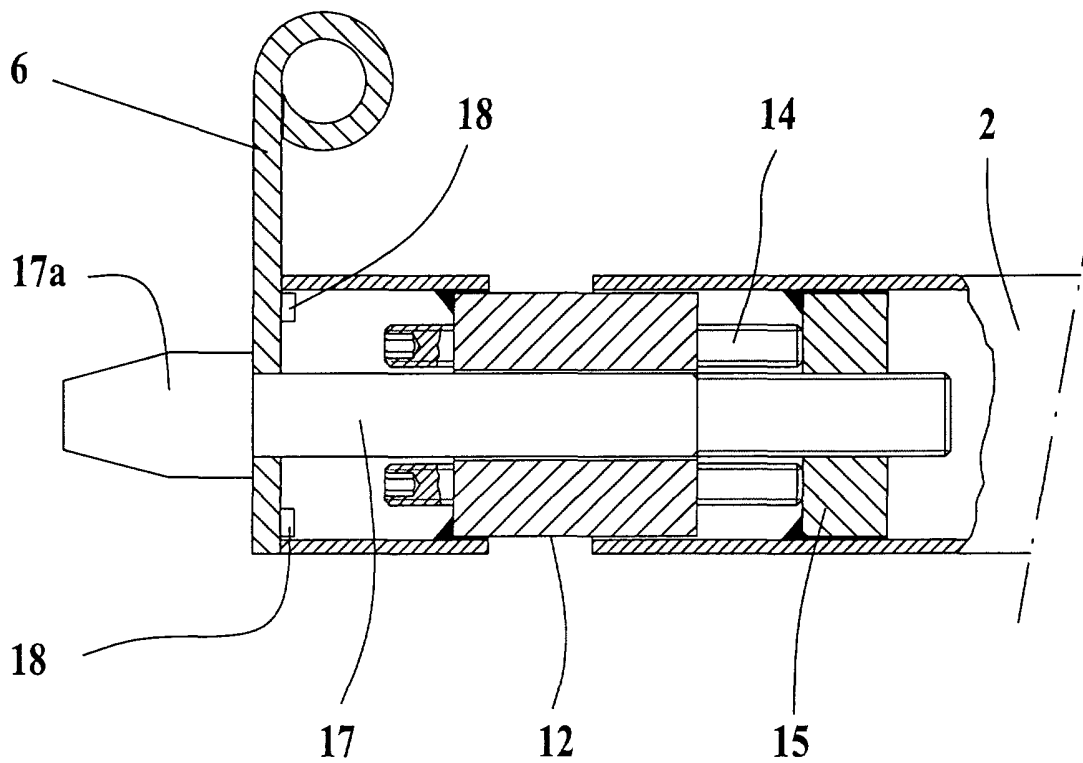
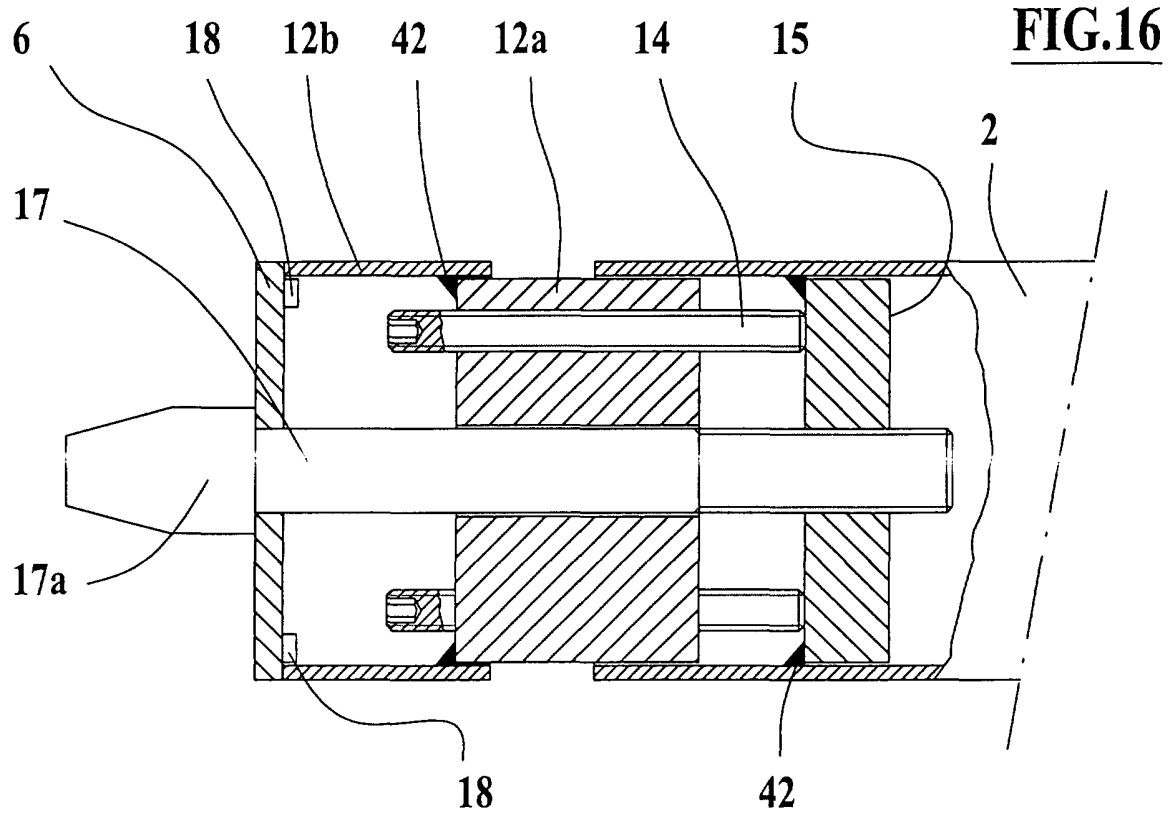


FIG.17

FIG.18

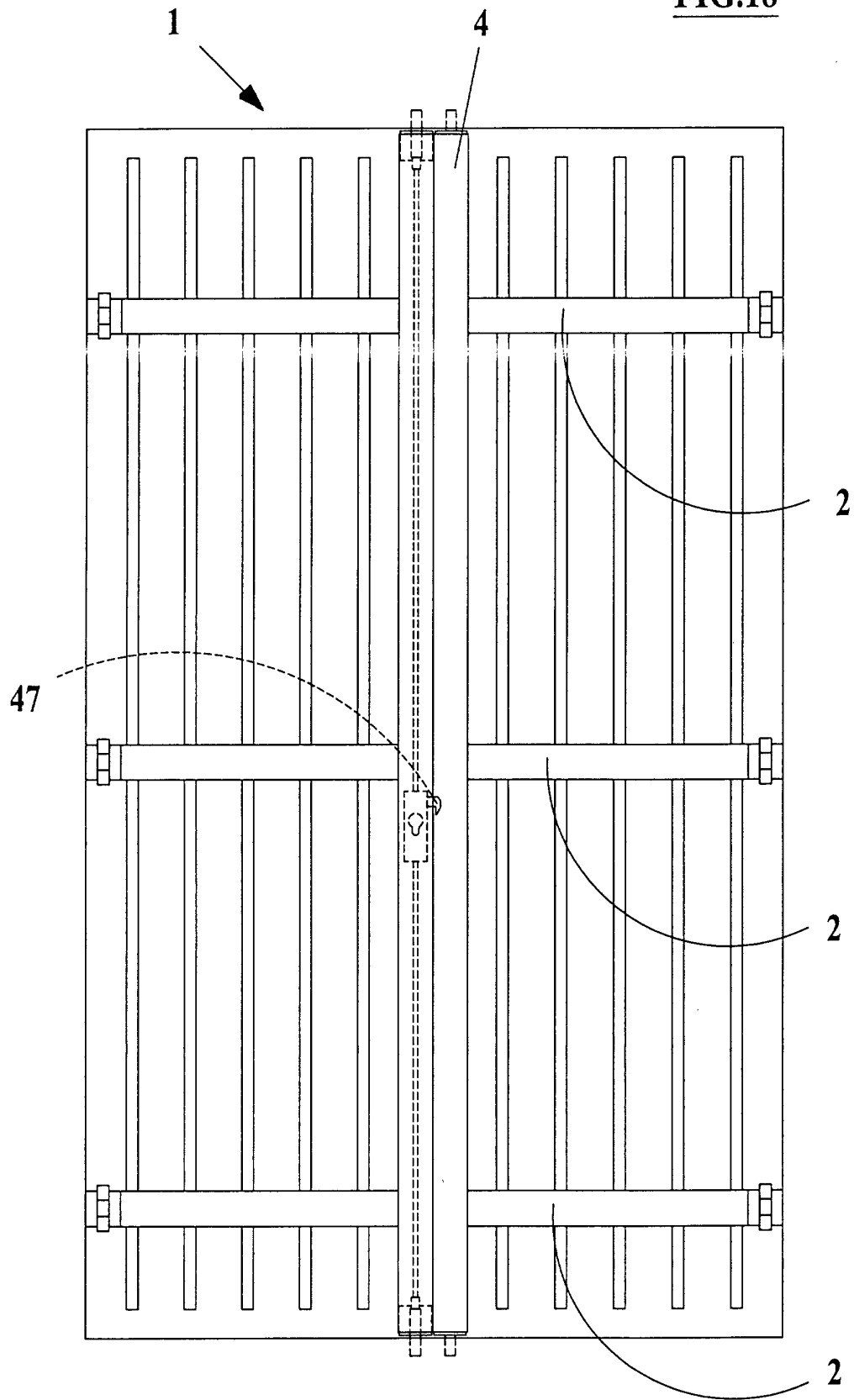


FIG.19

