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(54) **Drawer with front panel provided with an adjustment lock system for said front panel**

(57) The present invention relates to a drawer (C) comprising a front door (A) and an adjustment lock system of said front door (A); said system comprising a first adjustment lock device (2) of the door (A) with respect to the drawer (C) according to a "Z" axis and optionally a second adjustment lock device (1) of the door (A) with respect to the drawer (C) according to a horizontal axis "X" and a vertical axis "Y".

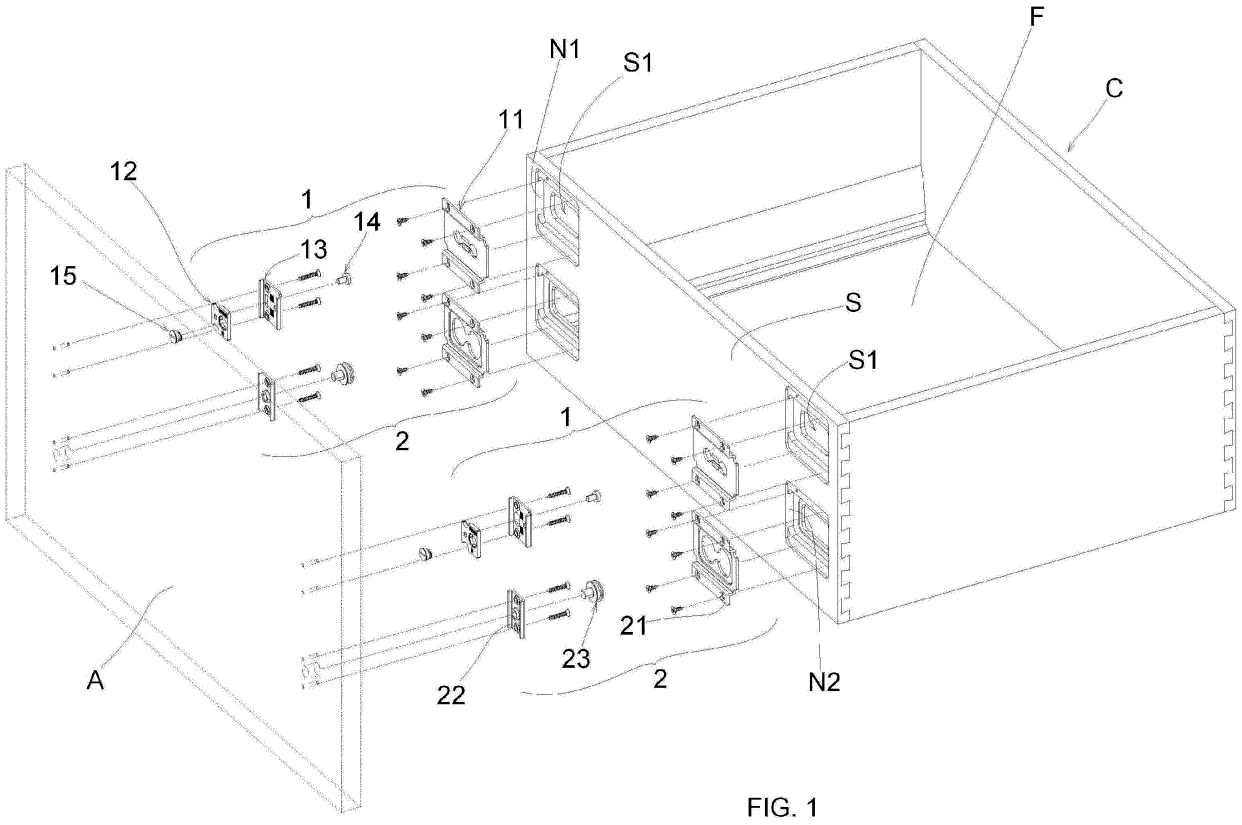

FIG. 1

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Description

[0001] The present patent application for industrial invention relates to a drawer provided with front door and comprising an adjustment lock system for said front door.

[0002] A drawer provided with front door is a drawer composed of a horizontal bottom and at least one front vertical side where a front door is fixed.

[0003] Said front door, or finishing door, is adapted to remain visible when the drawer is closed, covering the compartment where the drawer is contained.

[0004] Said front door is often higher and wider than the front side.

[0005] The peculiarity of the devices used to connect said door to the drawer consists in that they allow for adjusting the door after positioning the drawer inside the furniture.

[0006] The drawback of the devices that are currently available on the market refers to the complexity of the adjustment operation of the front door with respect to the drawer.

[0007] In order to be actuated, some devices require to remove the drawer from the compartment, whereas other devices do not permit a rapid, intuitive locking of the door on the drawer, in such manner that the position of the door can accidentally change upon locking.

[0008] JP 5007515 discloses an adjustment system that comprises adjustment elements disposed between a front frame of a piece of furniture and a decorative plate of a drawer. Such an adjustment system allows for adjusting the decorative plate in order to make it easier to assemble the drawer with respect to the furniture, without impairing the aesthetics of the furniture because of the adjustment system.

[0009] The purpose of the present invention is to devise a drawer with front door provided with adjustment lock system that permits to adjust the position of the door with respect to the drawer and lock the door, without impairing its position.

[0010] In order to achieve the aforesaid purpose, the drawer of the invention comprises a system provided with at least a first adjustment lock device composed of a first adjustment means and a first lock means.

[0011] Said first device permits to move the door with respect to the drawer according to a "Z" axis perpendicular to the front door.

[0012] Optionally, said system comprises a second adjustment lock device that permits to move the front door with respect to the drawer according to a horizontal axis "X" and a vertical axis "Y".

[0013] According to an additional embodiment of the invention, said apparatus is composed of a single device that incorporates the first and second adjustment lock device.

[0014] The description of the invention continues with reference to attached drawings, which only have an illustrative, not limiting value, wherein:

- Figure 1 is an exploded axonometric view of the drawer of the invention provided with adjustment lock system of the front door.
- Figure 1a is an enlarged view of a detail of Fig. 1 showing the adjustment lock system;
- Figure 2 is a sectional view of Fig. 1 according to the vertical plane;
- Figure 3 is an axonometric view of the drawer of the invention with front door connected to the front side of the drawer by means of the adjustment lock means;
- Figure 4 is a detailed front view of the adjustment lock devices of Fig. 3;
- Figure 4a is a sectional view of the devices of Fig. 3 according to plane IV-IV;
- Figures 5 and 6 are two detailed front views of the adjustment lock devices of Fig. 3, respectively at the end of the lower and upper travel;
- Figures 5a and 6a are a sectional view of Fig. 5 along plane V-V and Fig. 6 along plane VI-VI, respectively;
- Figures 7 and 8 are two sectional views showing two operating positions of the first adjustment lock devices along the "Z" axis.
- Figure 9 to 11 are axonometric views showing the assembly of the drawer according to the invention.
- Figure 12 is an exploded axonometric view of the drawer of the invention provided with adjustment lock system of the front door according to a second alternative embodiment.

[0015] The drawer (C) of the invention comprises a horizontal bottom (F) and a vertical front side (S) where a front door (A) is fixed.

[0016] Said system comprises a first adjustment lock device according to a "Z" axis, which is adapted to adjust the distance between the front side (S) of the drawer (C) and the front door (A).

[0017] As shown in the enclosed figures, said system preferably comprises a pair of said first adjustment lock devices (2).

[0018] Each of said first devices (2) comprises:

- a first bracket (21) fixed on the front of the front side (S) of the drawer (C);
- a first plate (22) fixed on the back of the front door (A);
- fixing adjustment means (23, 22a, 21a) according to a "Z" axis between said first bracket (21) and said first plate (22).

[0019] Said fixing adjustment means (23, 22a, 21a) according to a "Z" axis consist in:

- a threaded hole (22a) obtained on the first plate (22);
- an adjustment screw (23) with threaded stem (23a) engaged in said threaded hole (22a) and a head (23b) with perimeter groove (23c);
- a keyhole slot (21a) obtained on the first bracket (21) with horizontal development, as shown in Fig. 1A.

[0020] Said keyhole slot (21a) has a central section (21b) and two end grooves (21c) to receive the head (23b) of the adjustment screw (23).

[0021] Referring to Figs. 9 to 11, the assembly of the first device (2) provides for:

- fixing the first plate (22) on the front door (A);
- fixing the first bracket (21) on the front side (S) of the drawer (C);
- bringing the front door (A) closer to the front side (S) of the drawer (C) according to an L-shaped direction in order to permit the insertion of the head (23b) of the adjustment screw (23) inside one of the two grooves (21c) of the keyhole slot (21a) - see Fig. 10 - and successively the horizontal translation of the head (23b) inside the keyhole slot (21a), making the central section (21b) penetrate inside the perimeter groove (23c) - see Fig. 11.

[0022] As shown in Fig. 11, said perimeter groove (23c) permits the sliding inside it of the edges of said central section (21b) of the keyhole slot (21).

[0023] Figs. 7 and 8 show that, by rotating the adjustment screw (23), the first plate (22) is brought closer or farther with respect to the first bracket (21).

[0024] It must be noted that the actuation of the adjustment screw (23) is permitted also when the front door (A) is fixed to the drawer (C) because of the provision of a first opening (S2) on the front side (S) in correspondence of the keyhole slot (21a) of the second bracket (21).

[0025] So, the head (23a) of the adjustment screw (23) can be actuated without disengaging the head (23a) from the keyhole slot (21a).

[0026] The system optionally comprises a second adjustment lock device (1) comprising:

- a second bracket (11) fixed on the front of the front side (S) of the drawer (C);
- a second plate (12) fixed on said second bracket (11) by means of adjustment lock means (14,11a) according to an "X" axis;
- a second cursor (13) fixed on the back of the front door (A) and positioned between said second bracket (11) and said second plate (12).

[0027] Said second cursor (13) and second plate (12) cooperate by means of adjustments means (12b, 13a, 15) according to a "Y" axis.

[0028] More precisely, said adjustment lock means (14,11a) according to an "X" axis consist in:

- a screw (14) with enlarged head (14a) inserted inside a slot (13b) obtained on the cursor (13) and screwed into a threaded hole (12a) obtained on the plate (12);
- a keyhole slot (11a) obtained on the second bracket (11) with horizontal development, as shown in Fig. 1A.

[0029] Said keyhole slot (11a) has an extended central section (11b) and two end grooves (11c) to receive the enlarged head (14a) of the screw (14).

[0030] The adjustment means (12b, 13a, 15) according to a "Y" axis between said second cursor (13) and second plate (12) consist in:

- an eccentric screw (15) with stem (15a) and eccentric enlarged head (15b);
- a through hole (13a) obtained on the cursor (13) where the stem (15a) is inserted;
- a hole (12b) obtained on the second plate (12) and adapted to house said eccentric enlarged head (15b).

[0031] As shown in Figs. 4, 4A, 5, 5A, 6, and 6A, the rotation of said eccentric screw (15) determines the upward or downward sliding of the cursor (13) with respect to the second plate (12).

[0032] As shown in all of the enclosed figures, the system of the invention preferably comprises two second adjustment lock devices (1).

[0033] The assembly of each of said two second devices (1) provides for:

- fixing the second bracket (11) to the front side (S) of the drawer (C);
- making the cursor (13) adhere to the second plate (12) and inserting the eccentric screw (15) inside the pair of holes (12b, 13a);
- fixing the cursor (13) on the back of the door (A), preferably with screw, in such manner to prevent the eccentric screw (15) from coming out of the holes (12b, 13a);
- inserting the screw (14) inside the slot (13b) of the cursor (13) and tightening it into the threaded hole (12a) of the second plate (12);
- (as shown in Figs. 9 to 11) bringing the front door (A) closer to the front side (S) of the drawer (C) according to an L-shaped direction in such manner to permit the insertion of the enlarged head (14a) of the screw (14) inside one of the two grooves (11c) of the keyhole slot (11a) - see Fig. 10 - and successively the horizontal translation of the enlarged head (14a) until it is positioned on the extended central section (11b) - see Fig. 11.

[0034] After mounting the front door (A) on the drawer (C), its position must be adjusted and stabilized by means of the second lock devices (1).

[0035] Adjustment along the "X" axis is obtained by making the screw (14) slide horizontally along the extended central section (11b) of the keyhole slot (11).

[0036] After finding the correct position along the "X" axis, the screw (14) is tightened so that the head (14a) bites against the edge of the extended central section (11b), which is suitably provided with knurled surface for higher grip between contact surfaces.

[0037] In order to actuate the screw (14), from the inside of the drawer, the front side (S) of the drawer (C) is provided with a second opening (S1).

[0038] Through said second opening (S1) the eccentric screw (15) is actuated in order to make the cursor (13) slide with respect to the second plate (12) with consequent movement of the front door (A) along the "Y" axis.

[0039] The actuation of the screw (15) from inside the drawer (C) is possible because when the enlarged head (14a) of the screw (14) is in the extended central section (11b) of the slot (11), the tip of the stem (15a) of the eccentric screw (15) is situated in one of the two grooves (11c) of the keyhole slot (11), as shown in Fig. 11.

[0040] As mentioned above, referring to Figs. 4, 4a, 5, 5a, 6, and 6a, the rotation of the eccentric screw (15) determines a mutual movement of the cursor (13) with respect to the second plate (12) along the "Y" axis; said cursor (13) being fixed to the front door (A) and said second plate (12) being fixed by means of the screw (14) to the second bracket (11) - which is joined with the front side (S) of the drawer (C) - said mutual movement along the "Y" axis being translated into a movement of the front door (A) with respect to the drawer (C).

[0041] In order to move the cursor (13) by means of the eccentric screw (15), the screw (14) must not be tightened.

[0042] After being rotated in the correct position, the eccentric screw (15) can be locked by tightening the screw (14), after positioning the front door (A) in the correct position first along the "Y" axis and then along the "X" axis.

[0043] Referring to Figs. 9 to 11, the provision of said openings (S1 and S2) permits to actuate the first (2) and second device (1), with consequent movement of the front door (A), directly from the inside of the drawer (C) also when the same is installed in the furniture, by simply opening the drawer (C).

[0044] In order for the front door to engage on the front of the front side (S) of the drawer (C), the drawer (C) is provided, for each device (1, 2), with a niche (N1,N2) on the front side (S), which exactly contains the adjustment lock device (1, 2).

[0045] Moreover, it must be noted that said niche (N1,N2) can be alternatively obtained on the back side of the front door (A).

[0046] It must be additionally noted that, when used in combination with the second device (1), said first adjustment lock device (2) according to a "Z" axis permits the oscillation of the front door (A) with respect to a horizontal axis passing through the pair of said second adjustment lock devices (1).

[0047] Finally, Fig. 12 shows the system according to a second embodiment of the invention.

[0048] According to said second embodiment, the system comprises two identical monolithic adjustment lock devices (103), each of them being composed of said first (2) and second (1) adjustment lock device.

[0049] As shown in the figures, said monolithic device (103) integrates both the aforementioned devices (1 and 2).

[0050] In said monolithic device (103) the first (21) and second bracket (11) are the same monolithic bracket (111), and likewise the first (22) and second plate (12) are the same monolithic plate (112).

Claims

1. A drawer (C) comprising:

- - a vertical front side (S), a front door (A) and an adjustment lock system of said front door (A) with respect to said front side (S); a drawer **characterized in that** said system comprises a first adjustment lock device (2) according to a "Z" axis, composed of:

  - a first bracket (21) fixed on the front of the front side (S) of the drawer (C);
  - a first plate (22) fixed on the back of the front door (A);
  - fixing adjustment means (23, 22a, 21a) according to a "Z" axis between said first bracket (21) and said first plate (22).

2. A drawer (C) as claimed in the preceding claim, **characterized in that** said fixing adjustment means (23, 22a, 21a) according to a "Z" axis consist in:

- a threaded hole (22a) obtained on the first plate (22);
- an adjustment screw (23) with threaded stem (23a) engaged in said threaded hole (22a) and a head (23b) with perimeter groove (23c);
- a keyhole slot (21a) obtained on the first bracket (21) with horizontal development.

3. A drawer (C) as claimed in the preceding claim, **characterized in that** said keyhole slot (21a) is provided with a central section (21b) and two end grooves (21c) to receive the head (23b) of the adjustment screw (23); it being provided that said perimeter groove (23c) allows the edges of said central section (21b) of the keyhole slot (21) to slide inside it.

4. A drawer (C) as claimed in one of the preceding claims, **characterized in that** the front side (S) of the drawer (C) has a first opening (S1) in correspondence of the first bracket (21) by which the adjustment lock means of said first device (2) are actuated.

5. A drawer (C) as claimed in one of the preceding claims, **characterized in that** the front side (S) of the drawer (C) is provided with a first niche (N2) that completely houses the second adjustment lock de-

vice (2).

6. A drawer (C) as claimed in one of the preceding claims, **characterized in that** said system comprises at least a second adjustment lock device (2) according to an "X" axis.

7. A drawer (C) as claimed in the preceding claim, **characterized in that** said second device (1) comprises:

- a second bracket (11) fixed on the front of the front side (S) of the drawer (C);
- a second plate (12) fixed on said second bracket (11) by means of adjustment lock means (14,11a) according to an "X" axis;
- a second cursor (13) fixed on the back of the front door (A) and positioned between said first bracket (11) and said first plate (12).

8. A drawer (C) as claimed in the preceding claim, **characterized in that** said adjustment lock means (14,11a) according to an "X" axis comprise:

- a slot (13b) obtained on the cursor (13);
- a threaded hole (12a) obtained on the second plate (12);
- a screw (14) with enlarged head (14a) inserted into the slot (13b) and screwed into said threaded hole (12a) obtained on the second plate (12);
- a keyhole slot (11a) obtained on the second bracket (11) with horizontal development.

9. A drawer (C) as claimed in the preceding claim, **characterized in that** said keyhole slot (11a) has an extended central section (11b) and two end grooves (11c) to receive the enlarged head (14a) of the screw (14).

10. A drawer (C) according to one of claims 7 to 9, **characterized in that** said second cursor (13) and said second plate (12) cooperate by means of regulation means (12b, 13a, 15) according to a "Y" axis.

11. A drawer (C) as claimed in the preceding claim, **characterized in that** said adjustment means (12b, 13a, 15) according to a "Y" axis between said second cursor (13) and said second plate (12) comprise:

- an eccentric screw (15) with stem (15a) and eccentric enlarged head (15b);
- a through hole (13a) obtained on the second cursor (13) where the stem (15a) is inserted;
- a hole (12b) obtained on the second plate (12) and adapted to house said eccentric enlarged head (15b).

12. A drawer (C) as claimed in one of claims 6 to 11, **characterized in that** the front side (S) of the drawer (C) has a second opening (S1) in correspondence of the second bracket (11) by which the adjustment lock means of said second device (1) are actuated.

13. A drawer (C) as claimed in one of the preceding claims, **characterized in that** the front side (S) of the drawer (C) is provided with a second niche (N1) that completely houses the second adjustment lock device (1).

14. A drawer as claimed in one of claims 6 to 13, **characterized in that** said system comprises a single monolithic adjustment lock device (103), composed of the first (2) and second (1) adjustment lock device; it being provided that the first (21) and second (11) bracket are the same monolithic bracket (111), and the first (22) and second (12) plate are the same monolithic plate (112).

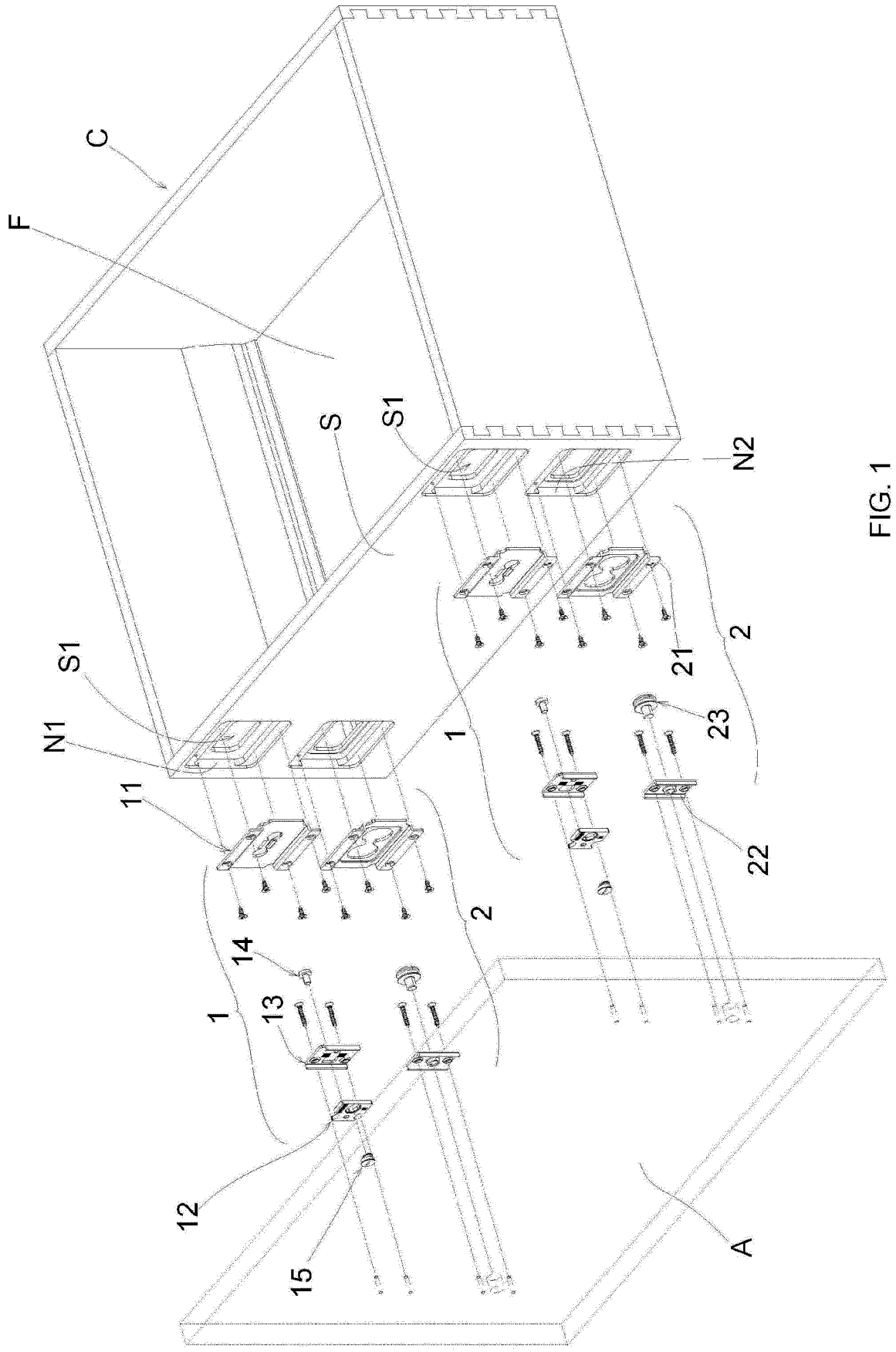

FIG. 1

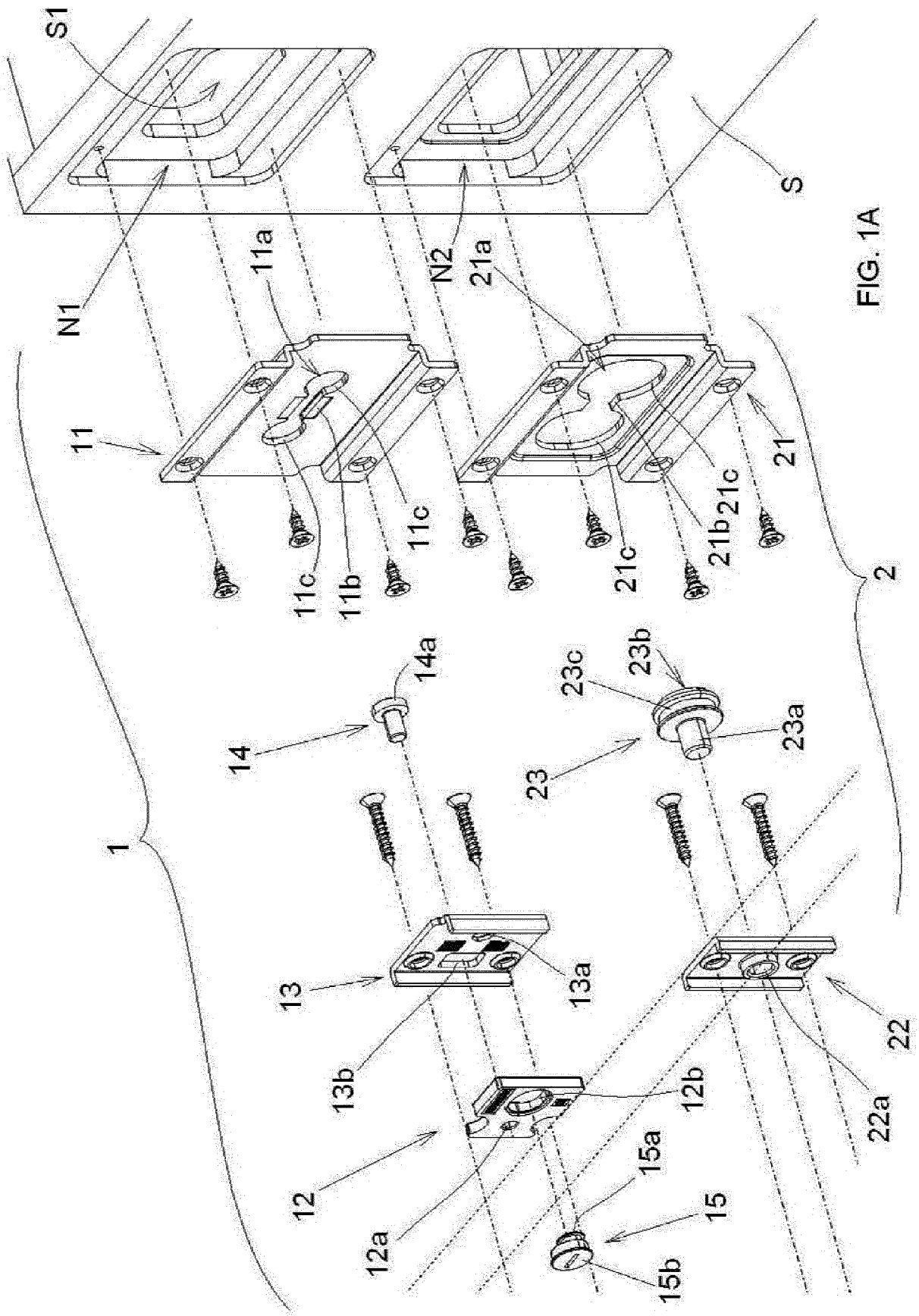
S1
N1
N2
S
11
11a
11c
11b
21
21a
21b
21c
1
2
14
14a
23
23a
23b
23c
13
13a
13b
12
12a
12b
15
15a
15b
22
22a

FIG. 1A

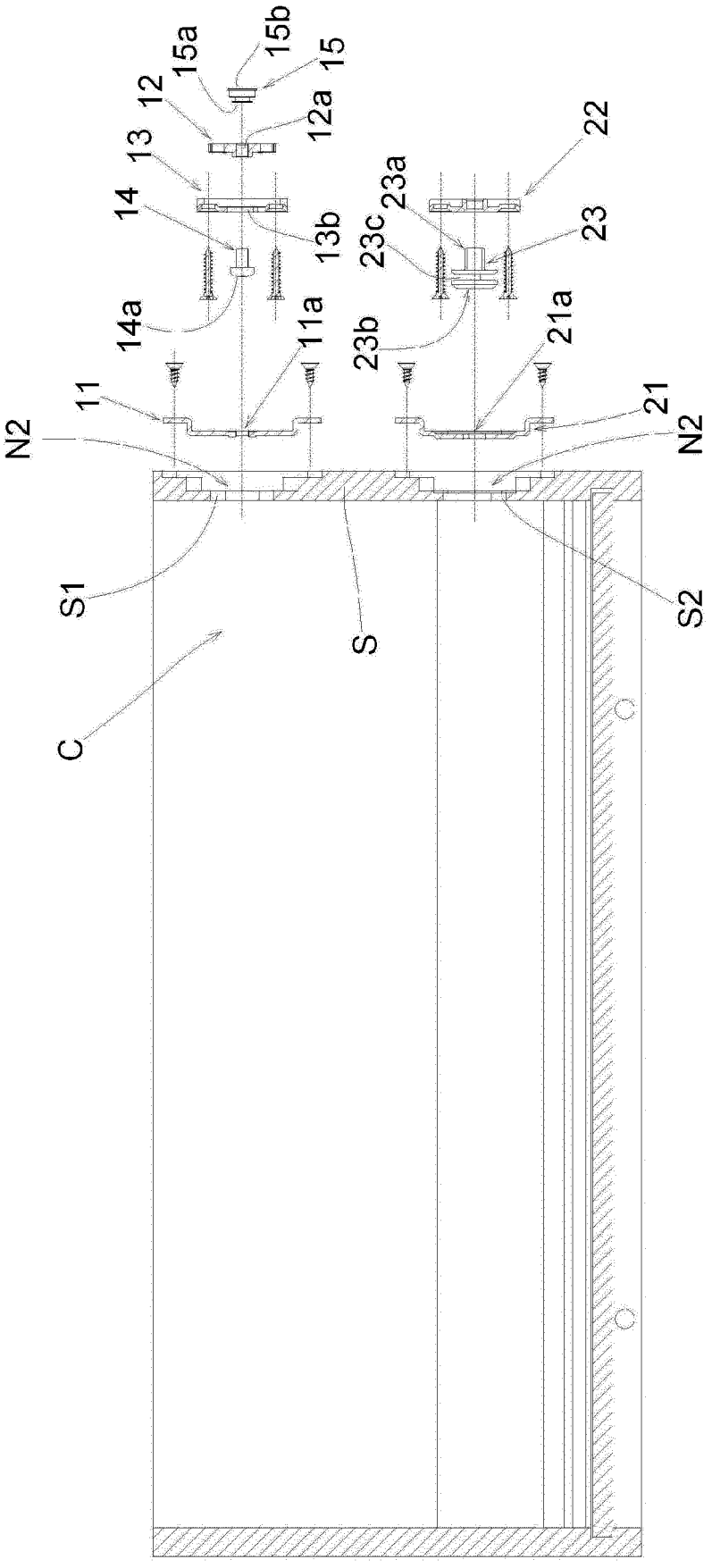
15b
15a
15
12
12a
13
22
23a
14
23c
23
13b
14a
11a
23b
21a
11
21
N2
N2
S1
S
S2
C

FIG. 2

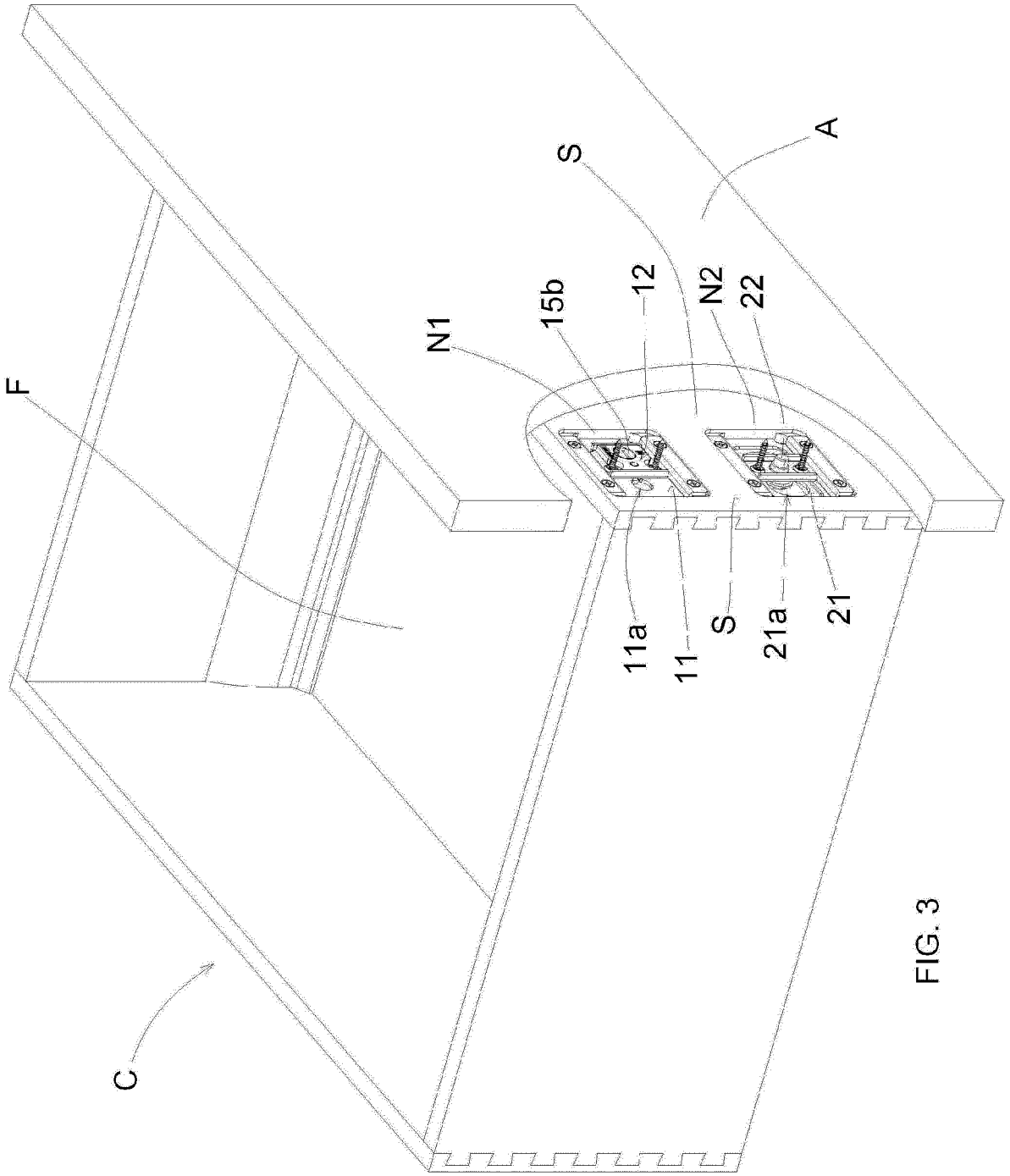

FIG. 3

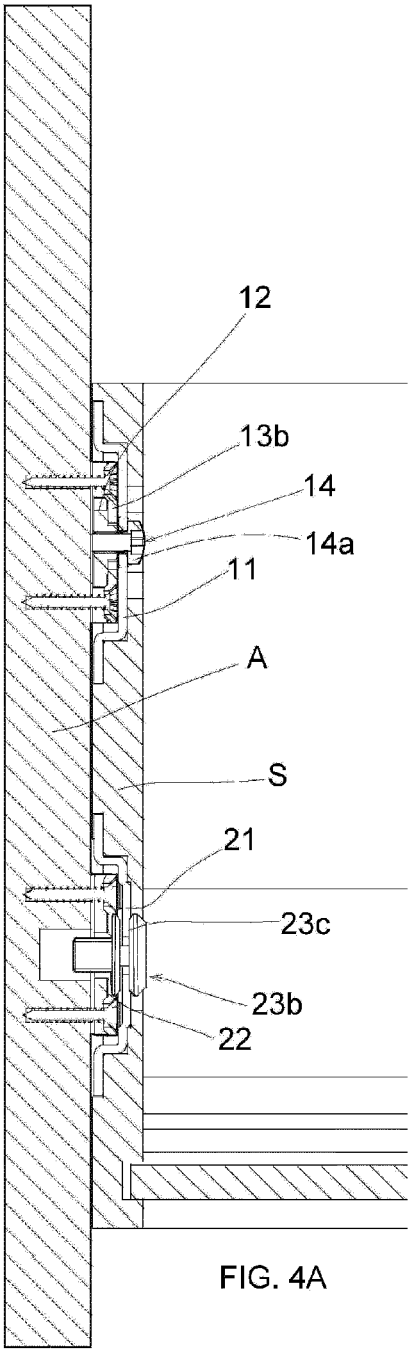
12
13b
14
14a
11
A
S
21
23c
23b
22

FIG. 4A

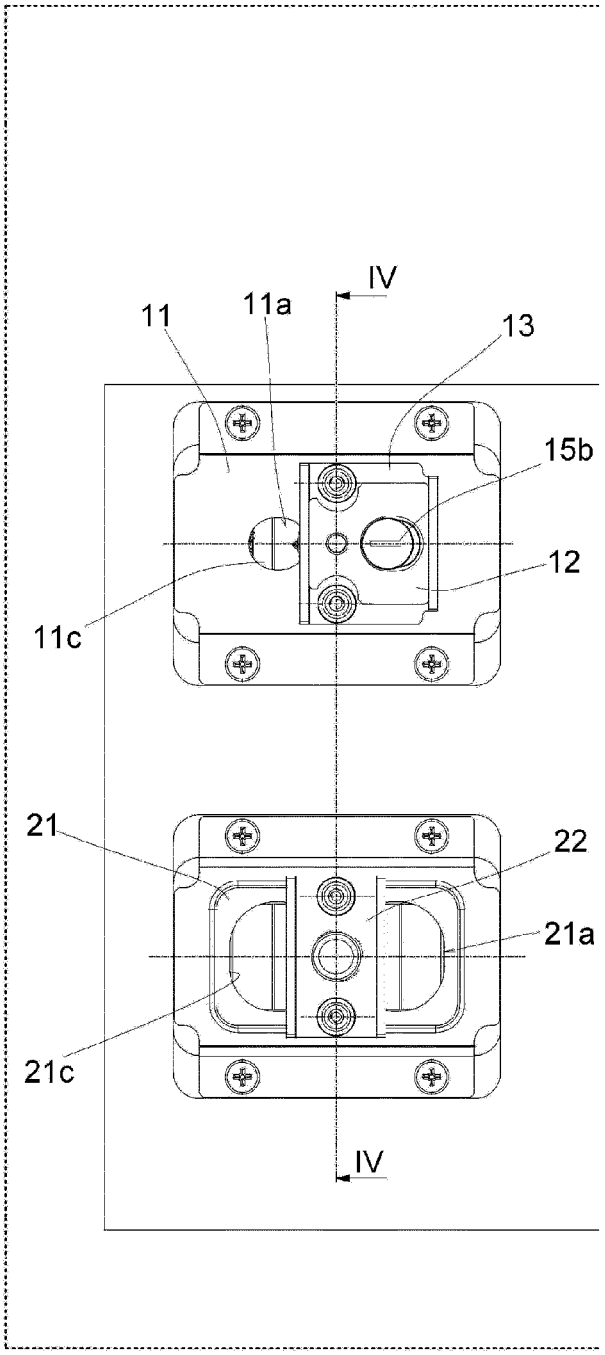
IV
11
11a
13
15b
12
11c
21
22
21a
21c
IV

FIG. 4

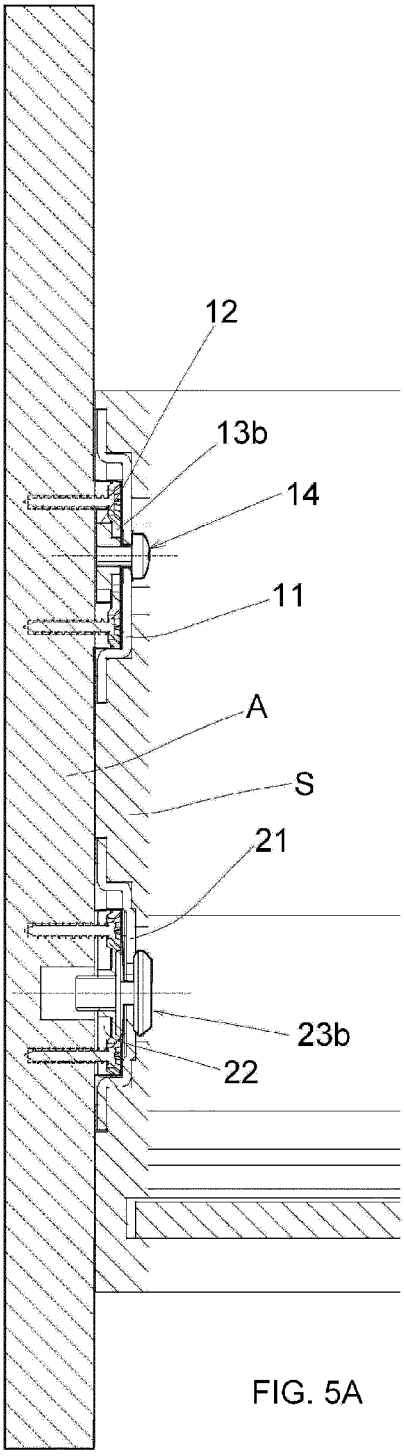

FIG. 5A

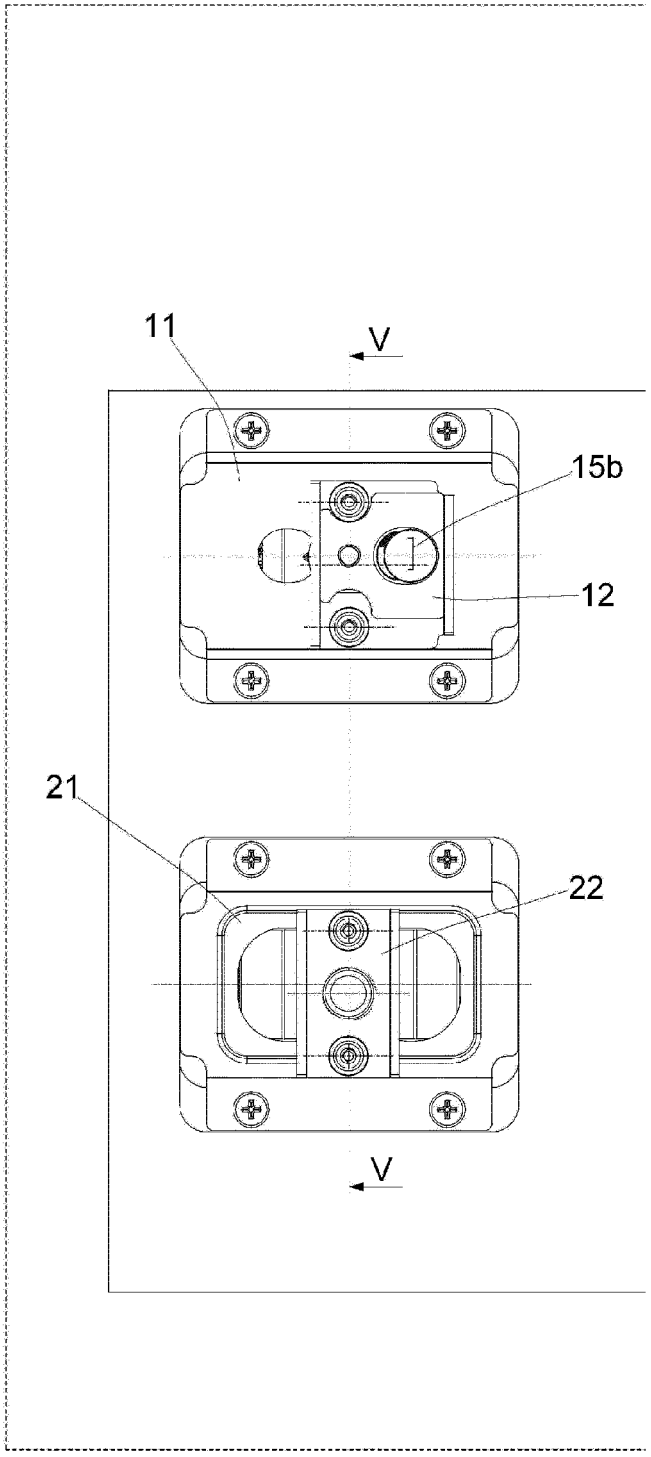

FIG. 5

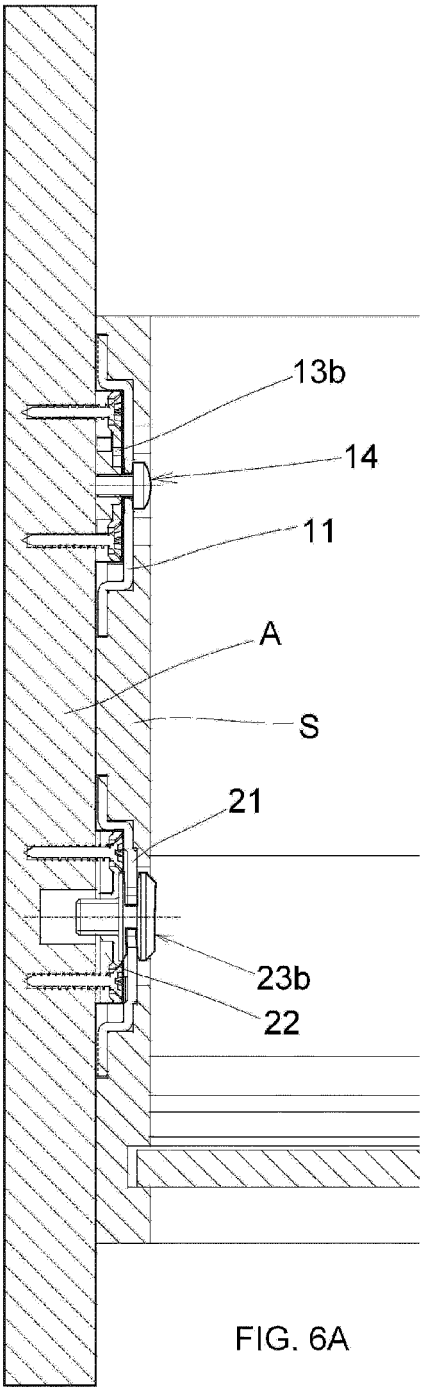

FIG. 6A

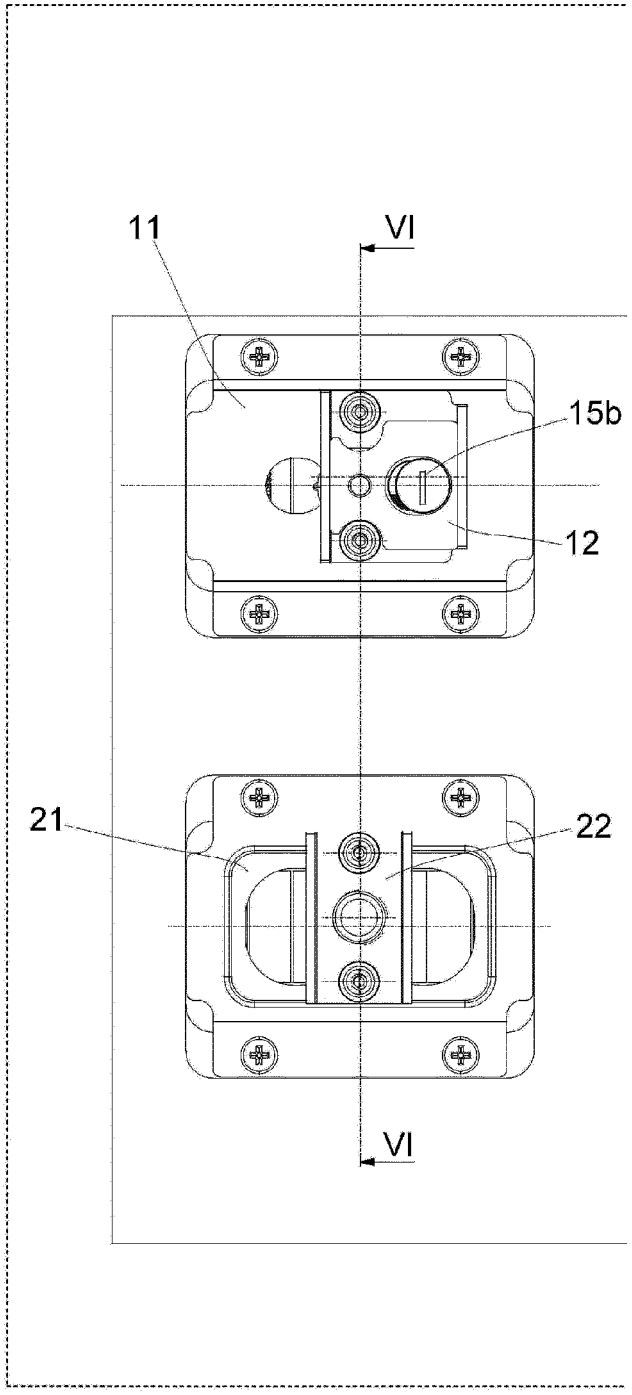

FIG. 6

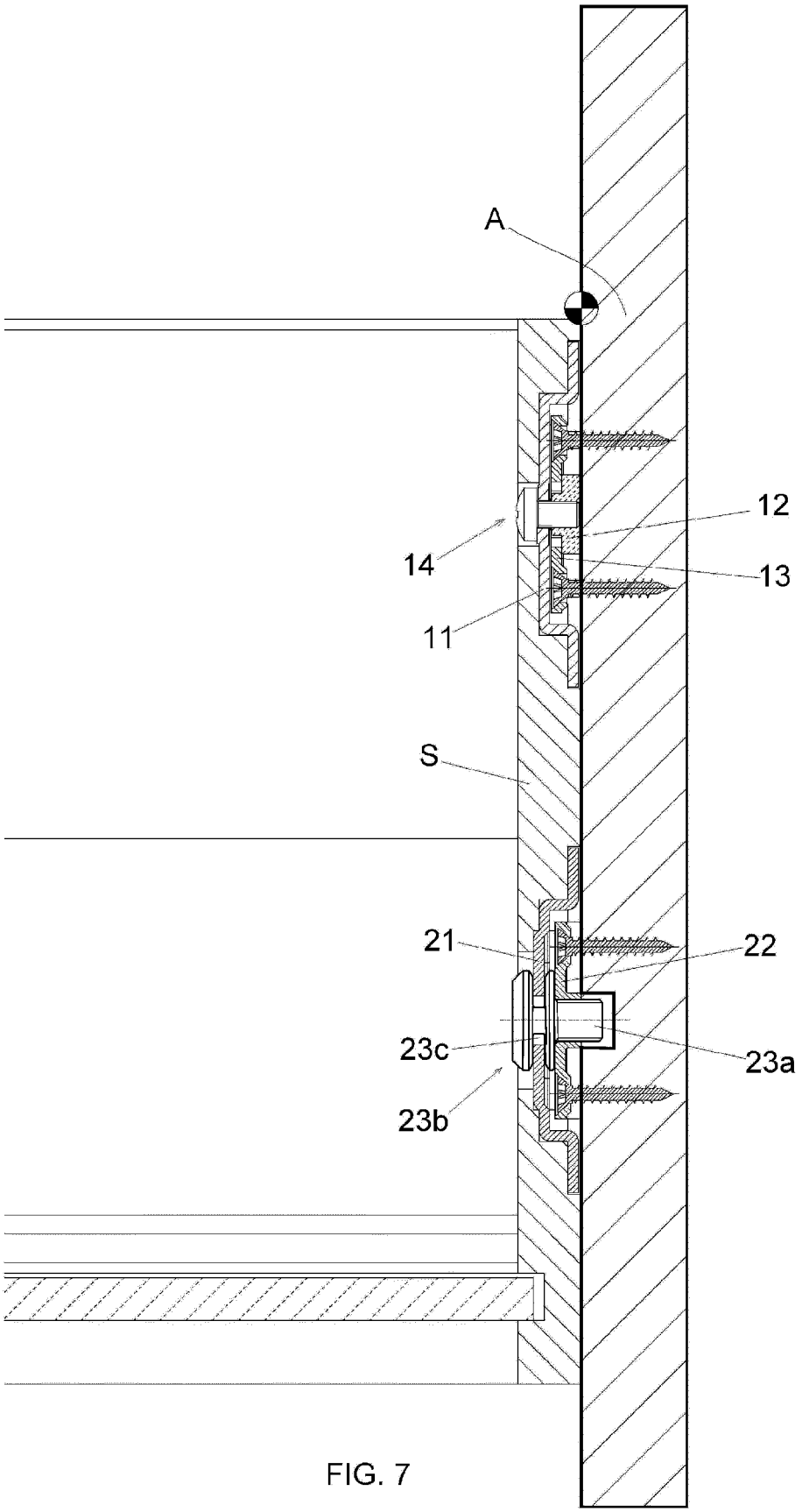

FIG. 7

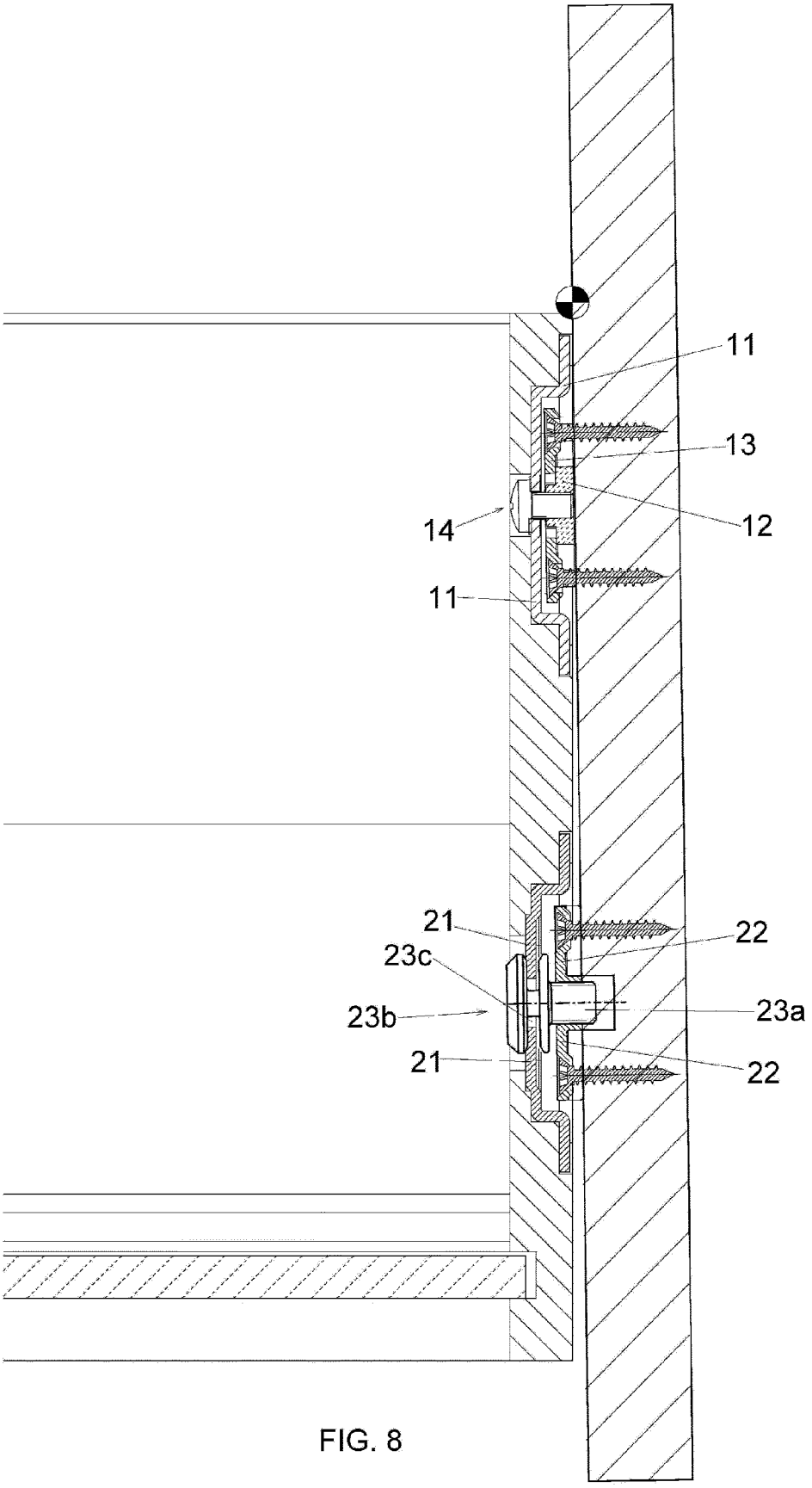

FIG. 8

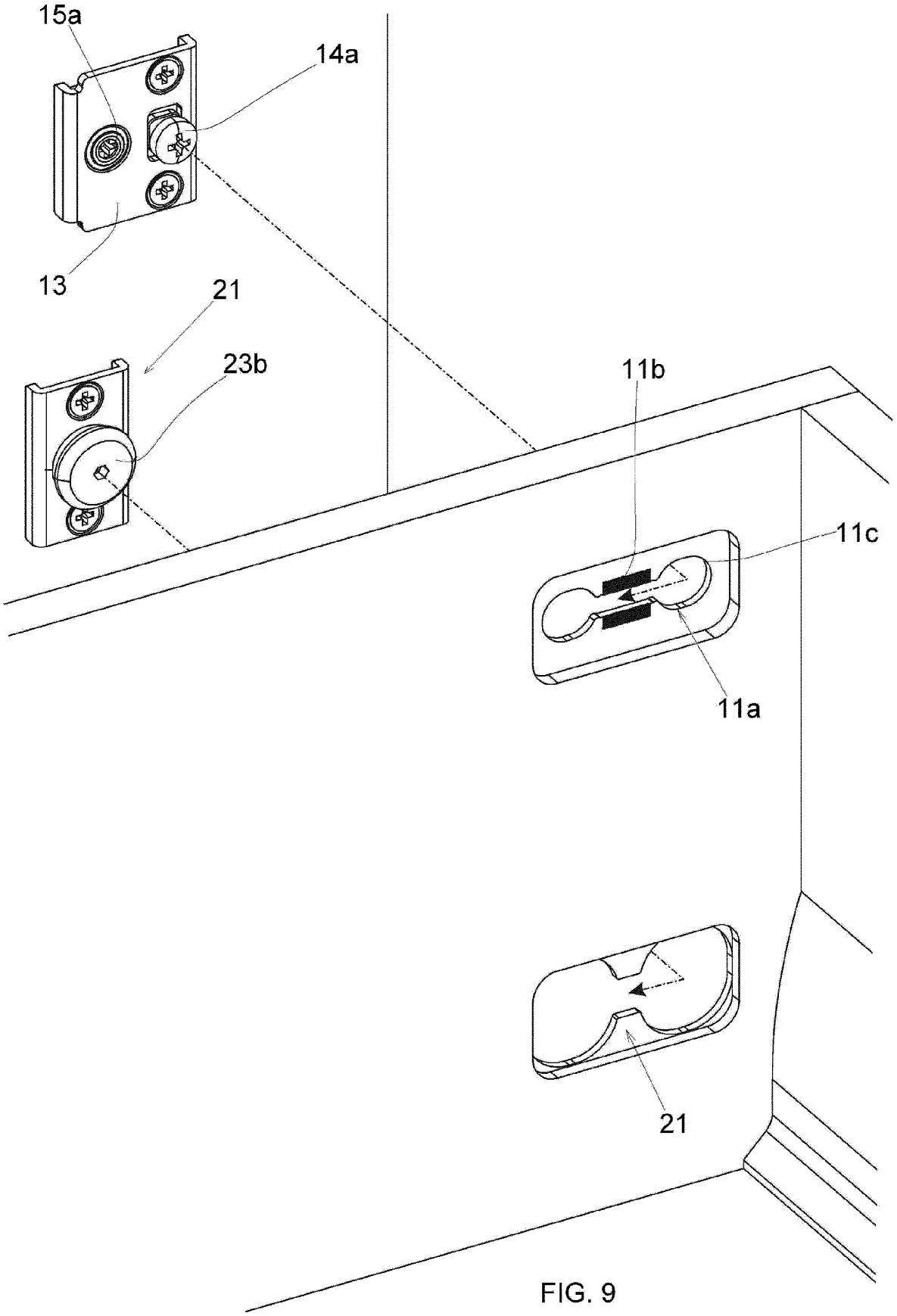

FIG. 9

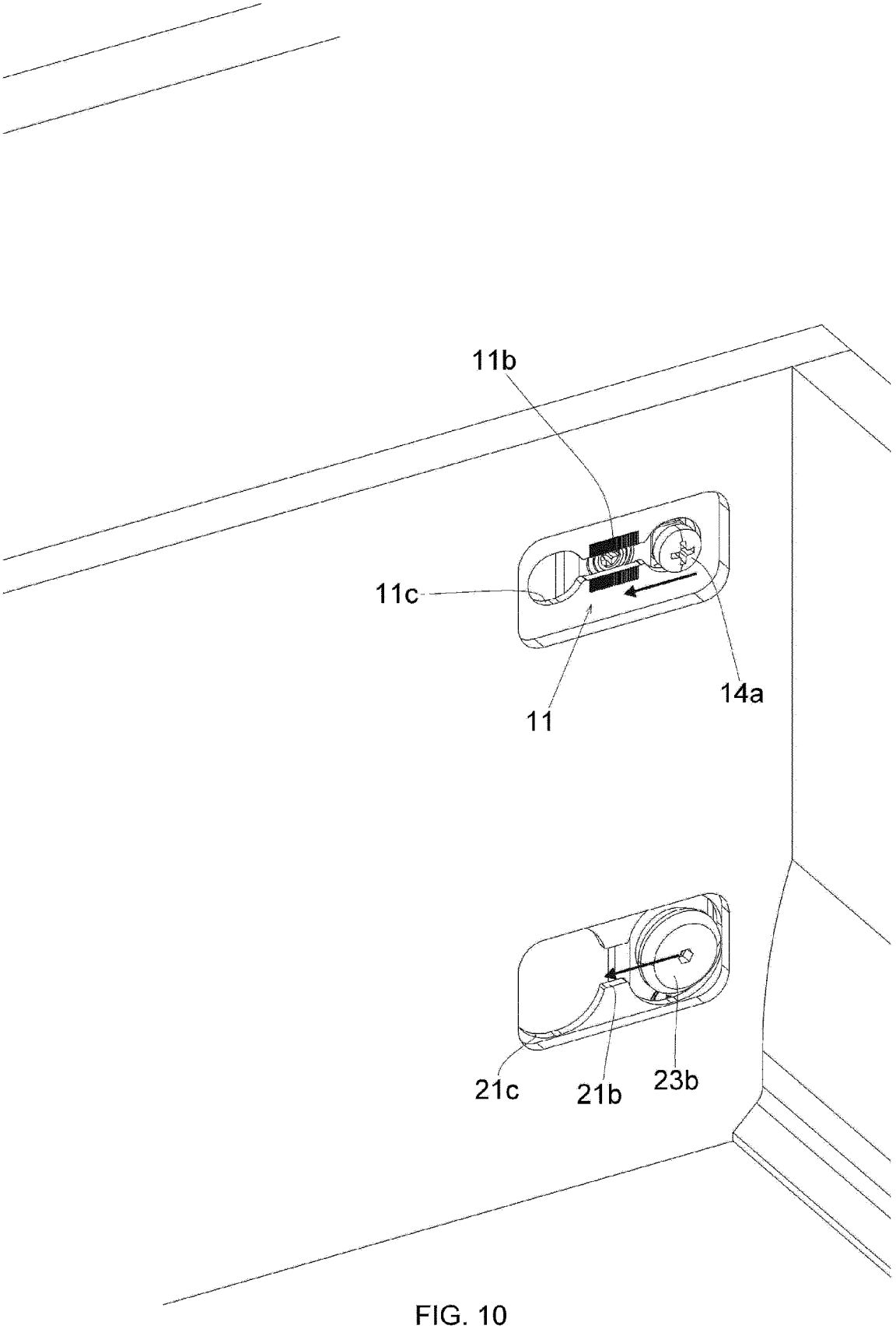

FIG. 10

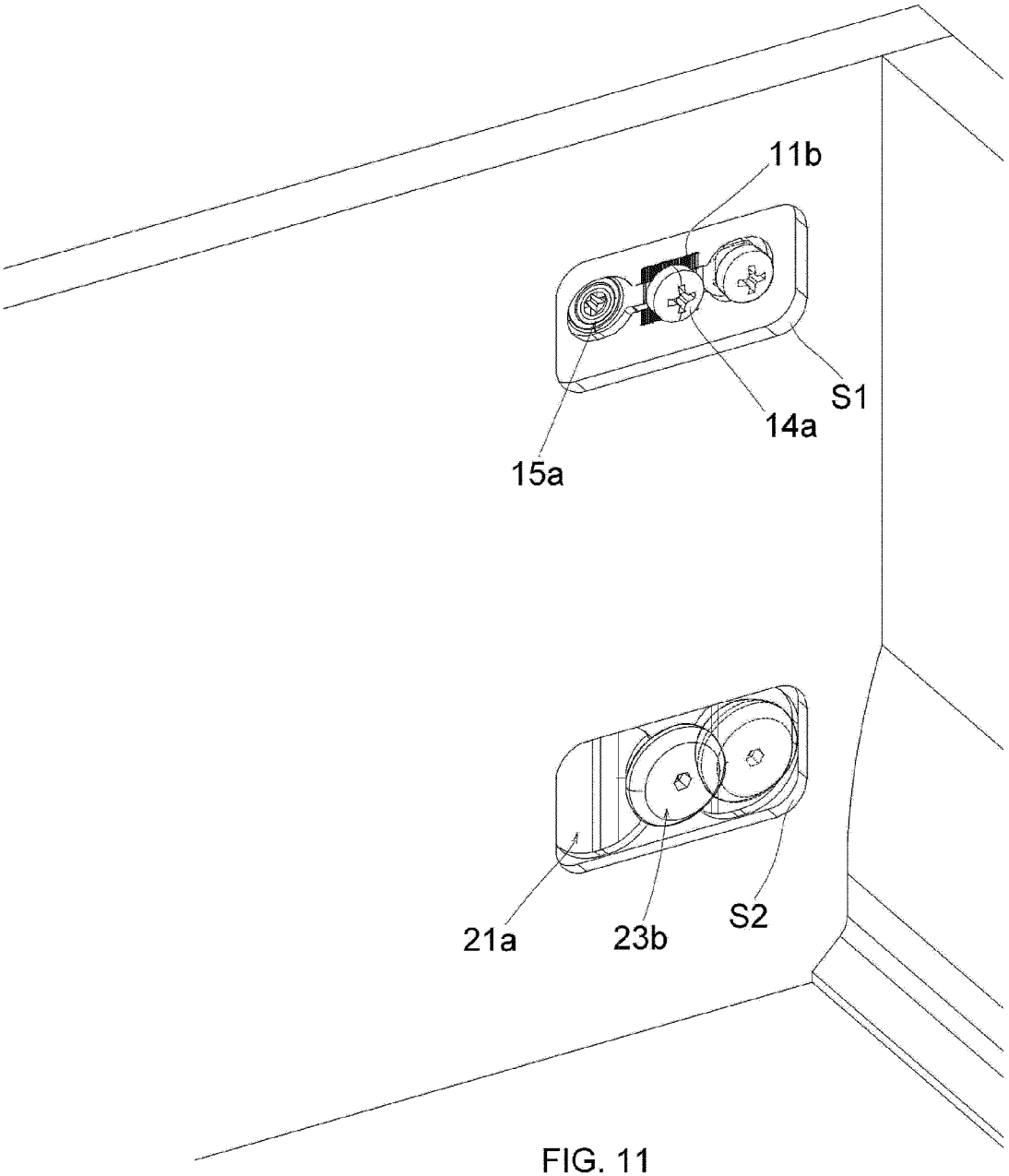

FIG. 11

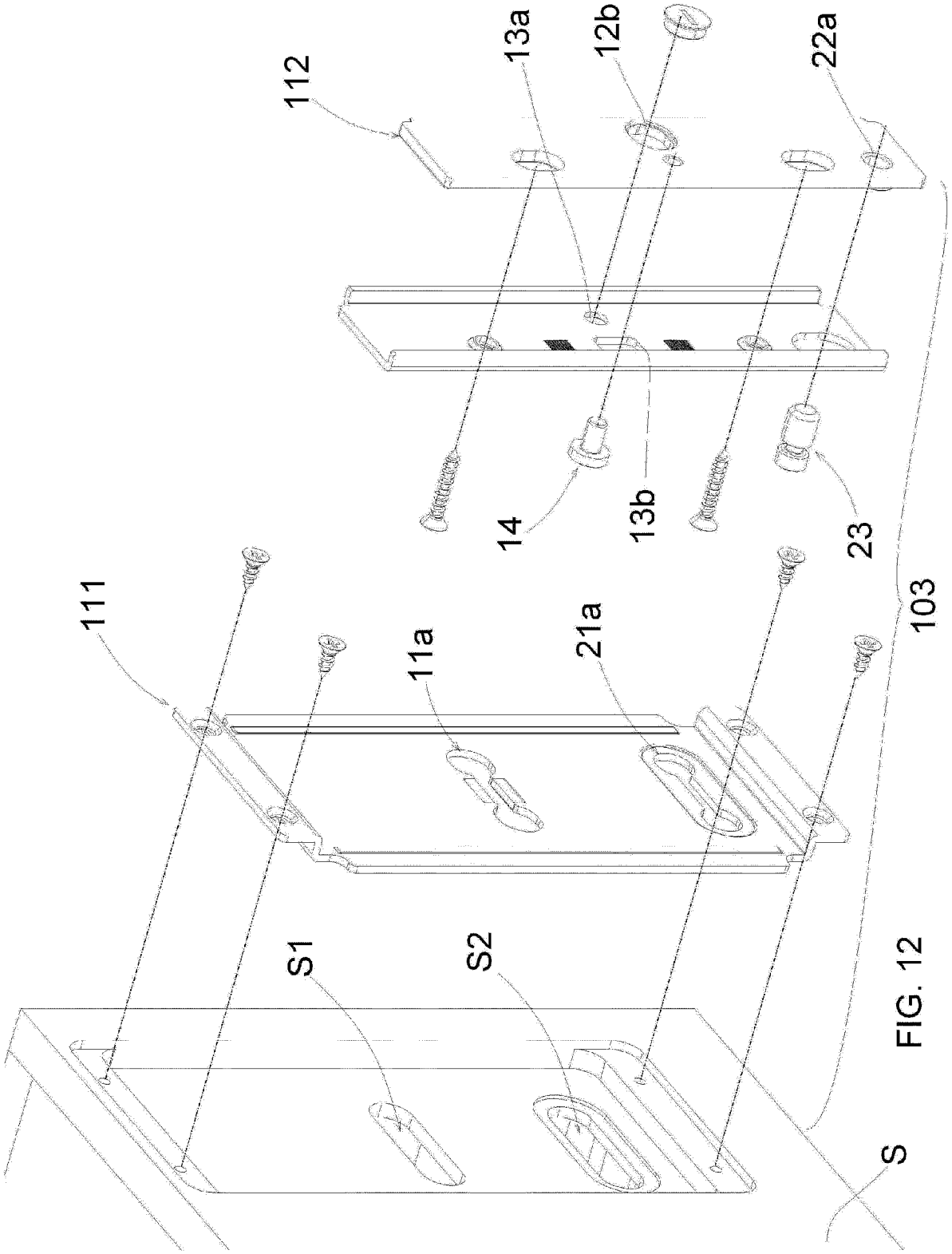

FIG. 12

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EUROPEAN SEARCH REPORT

Application Number
EP 12 16 8293

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2009/278431 A1 (WALBURN WILLIAM L [US]) 12 November 2009 (2009-11-12)	1	INV. A47B88/00
A	* paragraph [0020] - paragraph [0031]; figures 1-3 *	2-14	
A	JP 5 007515 A (TAKAHASHI KANAMONO KK; ISOKAWA SANGYO KK) 19 January 1993 (1993-01-19) * paragraph [0013] - paragraph [0053]; figures 1-25 *	1-14	
A	DE 80 21 658 U1 (JULIUS BLUM) 13 November 1980 (1980-11-13) * page 5 - page 7; figures 1-6 *	1-14	
A	US 2005/093407 A1 (FEELEY DAVID [US] ET AL) 5 May 2005 (2005-05-05) * paragraph [0025] - paragraph [0030]; figures 1-3 *	1-14	
			TECHNICAL FIELDS SEARCHED (IPC) A47B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 September 2012	Klintebäck, Daniel

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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