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(54) Adjustable picture hook

(57) The present invention refers to an adjustable picture hook composed of two plates (1;2) matched together with the possibility of vertical sliding, with one plate (1) provided with means (1a) for fixing to the picture and the other plate (2) provided with hole or slot (2a) for fixing to support means on the wall.
According to the different constructive embodiments, the hook can be adjusted by acting on the sliding plates (1;2) directly or with the aid of suitable adjustment means that determine the mutual sliding of the plates.

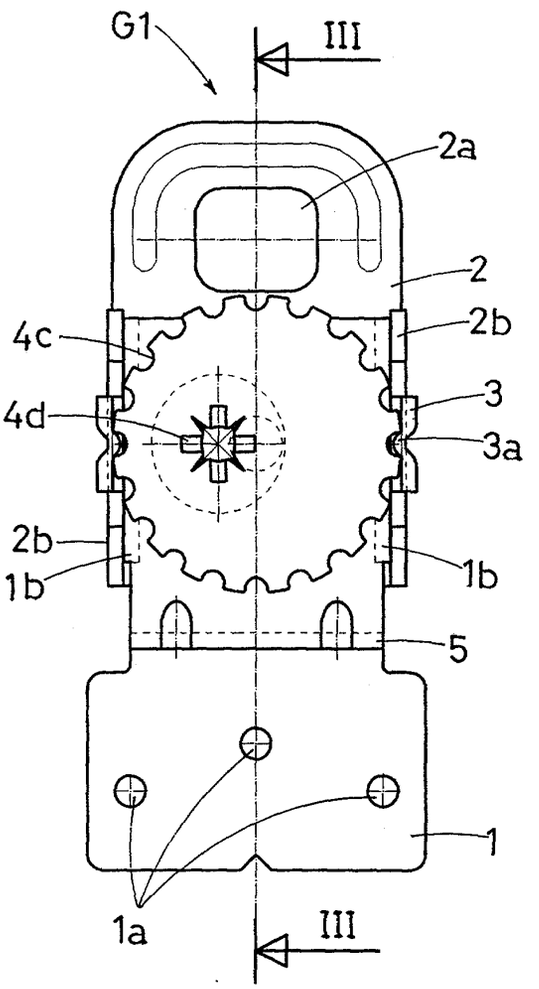

FIG. 1

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Description

[0001] The present patent application refers to an adjustable picture hook that allows for adjusting the distance between the point in which it is fixed to the picture and the position of the nail on the wall.

[0002] Pictures are normally hung to the wall by means of suitable hooks applied on the back of the frame and provided with an upper eyelet where the nail is inserted, after driving it onto the wall.

[0003] In the case of a single hook in the centre of the upper side of the frame, the centre of the upper side must be carefully identified, since even a small mistake in measuring may prevent the picture from assuming the correct position spontaneously, that is say from being perfectly perpendicular with respect to the vertical axis of the nail. Normally, two hooks are used to avoid this problem and provide safe fixing, for example in the case of very large or heavy pictures.

[0004] The use of two hooks, however, is disadvantageous since it requires total accuracy in identifying the two points on the wall where the two nails are to be driven.

[0005] Total accuracy is needed to obtain the perfect horizontal alignment of the two nails and consequently the perfect position of the picture.

[0006] A new model of adjustable picture hook has been devised in order to allow for tolerance margins in the horizontal alignment of the nails, incorporating means used to change the distance between the point where the hook is fixed to the picture and the nail on the wall.

[0007] The hook can be adjusted either manually or with the aid of suitable built-in adjustable means.

[0008] In other words, the adjustable picture hook of the invention allows for set off small mistakes in the horizontal alignment of the two nails driven onto the wall, since the picture can be slightly raised or lowered by adjusting the hook, thus obtaining the perfect perpendicular position of the picture, in spite of the fact that the two nails are not perfectly aligned horizontally.

[0009] The built-in adjustable means are provided immediately above the upper side of the picture frame, in easily accessible position for the user, who can adjust them without removing the picture from the wall.

[0010] The adjustable hook of the invention is composed of two plates matched together with the possibility of sliding vertically, with one plate provided with means for fixing to the picture frame and the other plate provided with holes or slots for fixing to the nail on the wall.

[0011] The hook of the invention also comprises connection and fastening means for the plates, which allow for changing the position in which the plates are mutually held.

[0012] According to the simplest constructive embodiment of the hook of the invention, the adjustment is made manually by loosening the fastening means and holding them back in position once the picture has been placed correctly.

[0013] The fastening means consist in a screw with horizontal axis that is inserted and slides in a vertical slot on the plate fixed to the picture frame, while the other plate, that is to say the plate fixed to the wall, is provided with a threaded hole to engage the fastening screw.

[0014] According to a more sophisticated constructive embodiment of the hook of the invention, the connection means also act as adjustment means.

[0015] In a first constructive embodiment, the connection and adjustment means consist in a pin with eccentric, whose rotation determines the sliding of one plate with respect to the other one.

[0016] More precisely, the pin with eccentric is housed and rotates in a hole suitable located on the plate fixed to the nail on the wall, while the other plate, that is to say the plate fixed to the picture frame, is provided with a slot in which the eccentric of the pin is engaged and slides.

[0017] Being an horizontal slot, the movement of the eccentric in the slot determines the vertical sliding of the plate fixed to the picture with respect to the plate fixed to the wall, thus raising or lowering the picture and modifying its inclination.

[0018] The plates are matched by means of guides that only allow for mutual translation.

[0019] The maximum adjustment travel is of course equal to the distance between the upper dead-end point and the lower dead-end point of the travel from the centre of the eccentric, it being evident that the upper dead-end point corresponds to the maximum height that can be reached by the plate fixed to the picture, and the lower dead-end point corresponds to the minimum height. However, it must be noted that in the two dead-end points the centre of the eccentric is perfectly aligned vertically with the centre of the pin, in such a way that the weight of the picture passes through the centre of the pin, while in all points of the travel from the centre of the eccentric, the pin is not aligned with respect to the centre of rotation of the pin, with consequent misalignment of the weight that is discharged on the centre of the eccentric.

[0020] This condition generates a torque that tends to draw the eccentric downwards until it reaches the lower dead-end point, thus losing the adjustment that had been previously made.

[0021] In order to solve this inconvenience, the hook of the invention has been provided with means to lock the pin in every position.

[0022] According to an alternative constructive embodiment of the hook of the invention, the connection and adjustment means consist in a screw with vertical axis that is inserted and idles in a hole on a support that protrudes on the front of the plate fixed to the nail on the wall, while the other plate is provided with a counter-support with a threaded hole, in which the adjustment screw is engaged, whose rotation determines the verti-

cal translation of the plate fixed to the picture with respect to the plate fixed to the wall.

[0023] For major clarity the description of the invention continues with reference to the enclosed drawings, which are intended for purposes of illustration and not in a limiting sense, whereby:

- Figure 1 is a front view of the hook in which the adjustment means consist in a pin with eccentric;
- Figure 2 is the orthogonal projection of Fig. 1 from the left side;
- Figure 3 is a section of the hook with plane 3-3 of Fig. 1, with a diagrammatic section of the upper side of the picture;
- Figure 4 is a rear view of the hook of Fig. 1;
- Figure 5 is a front view of the plate of the hook of Fig. 1 designed to be fixed to the picture;
- Figure 6 is a front view of the plate of the hook of Fig. 1 designed to be fixed to the nail on the wall;
- Figure 7 is a front view of a second constructive embodiment of the hook of the invention, in which the adjustment means consist in a screw;
- Figure 8 is a section of the hook of Fig. 7 with plane VIII-VIII - Fig. 9 shows one of the plates of the hook of Fig. 7, and more precisely the plate fixed to the wall, seen from above;
- Figure 10 shows one of the plates of the hook of Fig. 7, and more precisely the plate fixed to the picture, seen from above;
- Figure 11 is a front view of the hook of the invention according to a third constructive embodiment of the hook, provided with fastening means for the two sliding plates and not with adjustment means;
- Fig. 12 is a section of the hook of Fig. 11 with plane XII-XII of Fig. 11;
- Figure 13 is a front view of one of the plates of the hook of Fig. 11, and more precisely the plate designed to be fixed to the wall;
- Figure 14 is a front view of one of the plates of the hook of Fig. 11, and more precisely the plate designed to be fixed to the picture;
- Figure 15 shows an alternative constructive embodiment of the hook of Fig. 1;
- Figure 16 shows an alternative constructive embodiment of the hook of Fig. 7;
- Figure 17 shows an alternative constructive embodiment of the hook of Fig. 11;

[0024] As mentioned above, the adjustment of the hook of the invention can be carried out in a different way according to different embodiments, by acting on the sliding plates directly or with the aid of suitable adjustment means that determine the mutual sliding of the plates.

[0025] Figures 1 to 6 shows the version of the hook in which the adjustment means consist in a pin with eccentric;

[0026] In this version, the hook of the invention (G1) is composed of a first mobile plate (1), with lower holes (1a) for fixing to the picture frame, and a second fixed plate (2) that slides with respect to the first plate and is provided with an upper slot (2a) for fixing to the nail on the wall.

[0027] More precisely, the fixed plate (2) is laterally provided with two vertical guides (2b) that are matched with two corresponding vertical guides (1b) on the two sides of the mobile plate (1).

[0028] The two plates (1 and 2) are connected by means of a pin (4) that rotates in inside a hole (2c) in the centre of the fixed plate (2) and ends with an enlarged head (4a) next to an eccentric (4b) housed in a suitable slot (1c) on the mobile plate (1).

[0029] The length of the horizontal slot (1c) is such that the eccentric (4b) can make a vertical travel between the upper dead-end point and the lower dead-end point during the rotation of the pin (4) in the hole (2c).

[0030] The hook (G1) is provided with locking means of the pin (4) in every position, which consist in two elastically flexible jaws (3) on the two guides (2b) provided with an internal tooth (3a) that is engaged in the notches (4c) of the saw-toothed edge of the head (4a) of the pin (4).

[0031] Finally, it must be noted that the mobile plate (1) has a transversal connection step (5) between the lower half-wing with holes (1a) and the upper half-wing with the slot (1c) that houses the eccentric (4b).

[0032] The dimensions of the step (5) are such that the lower half-wing is coplanar to the fixed plate (2), as shown in Fig. 2.

[0033] In order to facilitate the rotation of the pin (4) during adjustment, the head (4a) of the pin (4) has a crossed configuration (4d) for the screwdriver.

[0034] Figures 7 to 10 show a second constructive version of the adjustable picture hook of the invention, defined as (G2), which is composed of two sliding plates (10 and 20), whose travels are guided by pairs of lateral guides (10b and 20b).

[0035] In this version (G2) the sliding of the plates (10 and 20) is determined by means of suitable adjustment means that consist in a screw (40) with vertical axis that is inserted and idles inside a housing (20c) on a support (20d) that protrudes on the front of the fixed plate (20) designed to be fixed to the nail on the wall, while the mobile plate (10) is provided with a counter-support (10d) with a threaded hole (10c), in which the threaded section of the adjustment screw (40) is engaged in helical way.

[0036] It must be noted that, also in this version (G2), the mobile plate (10) has a transversal connection step (50) between the lower half-wing (that is to say the one fixed to the back of the picture frame) and the upper half-wing from which the counter-tooth (10d) internally protrudes.

[0037] The dimensions of the step (50) are such that the lower half-wing is coplanar to the fixed plate (20), as shown in Fig. 8.

[0038] Also in this alternative version, the adjustment screw (40) can be accessed by the user without removing the picture from the wall.

[0039] As shown in Fig. 8, the head (40a) of the screw (40) can be accessed from above, over the support (20d) that is located in higher position on the transversal side of the frame, fixed under the step (50).

[0040] Figures 11 to 14 show a third constructive embodiment of the adjustable picture hook of the invention, provided with fastening means for the pair of sliding plates and not with adjustment means.

[0041] The hook (G3) of this version is composed of two sliding plates (100 and 200), whose travels are guided by pairs of lateral guides (100b and 200b).

[0042] In this version the plates (100 and 200) are connected by a fastening screw (400) with horizontal axis that is inserted and slides in a vertical slot (100c) on the plate (100) fixed to the picture frame, while the other plate (200), that is to say the plate fixed to the nail on the wall, is provided with a threaded hole (200c) where the fastening screw (400) is engaged.

[0043] It appears evident that the plates (100 and 200) are held in place once the picture has been placed in the correct position, by fastening the screw (400) with a screwdriver according to the configuration (400d) of the head (400a) engaged against the external side of the mobile plate (100).

[0044] It must be noted that, also in this constructive version, the mobile plate (100) has a transversal connection step (500) between the lower half-wing (that is to say the one fixed to the back of the picture frame) and the upper half-wing with slot (200c).

[0045] The dimensions of the step (500) are such that the lower half-wing is coplanar to the fixed plate (200), as shown in Fig. 12.

[0046] Also in this alternative version, the adjustment screw (400) can be accessed by the user without removing the picture from the wall.

[0047] As shown in Fig. 12, the head (400a) of the fastening screw (400) can be accessed frontally, immediately above the step (500).

[0048] Figures 15, 16 and 17 show the hooks (G1, G2 and G3) provided with a hook (1d, 10d, 100d) to support the picture, replacing the holes (1a, 10a or 100a).

Claims

1. Adjustable picture hook **characterised in that** it comprises:
   - a fixed plate (2 or 20 or 200) provided with at least one upper slot (2a or 20a or 200a) for fixing to supporting means on the wall, with the fixed plate being provided with guide elements (2b or 20b or 200b);
   - a mobile plate (1a or 10a or 100a) that slides with respect to the fixed plate (2 or 20 or 200) provided with lower means (1a or 10a or 100a or 1d or 10d or 100d) for fixing to the picture, with the mobile plate (1 or 10 or 100) being provided with guide elements (1b or 10b or 100b) capable of co-operating with the corresponding guide elements (2b or 20b or 200b) of the fixed plate (2 or 20 or 200);
   - connection means (4 or 40 or 400) between the pairs of sliding plates.

2. Adjustable picture hook as defined in claim 1, **characterised in that** the connections means also act as adjustment means for the travel of the mobile plate (1) and consist in a pin (4) that rotates inside a hole (2c) in the centre of the fixed plate (2) and ends with an enlarged head (4a) next to an eccentric (4b) housed in a suitable horizontal slot (1c) on the mobile plate (1), whose height is such that the eccentric (4b) can make a vertical travel between the upper dead-end point and the lower dead-end point during the rotation of the pin (4) in the hole (2c).

3. Hook as defined in claim 1 and 2, **characterised in that** the guide elements consist in parallel vertical guides (1b and 2b) on the two vertical sides of the mobile plate (1) and the fixed plate (2), respectively.

4. Hook as defined in claim 2 and 3, **characterised in that** it is provided with locking means of the pin (4) in every position, which consist in two elastically flexible jaws (3) on the two lateral guides (2b) provided with an internal tooth (3a) that is engaged in the notches (4c) of the saw-toothed edge of the head (4a) of the pin (4).

5. Adjustable picture hook as defined in claim 1, **characterised in that** the connection means also act as adjustment means for the travel of the mobile plate (1) and consist in a screw (40) with vertical axis that is inserted and idles inside a hole (20c) on a support (20d) that protrudes on the front of the fixed plate (20) fixed to the nail on the wall, while the mobile plate (10) is provided with a counter-support (10d) with a threaded hole (10c), in which the threaded section of the adjustment screw (40) is engaged.

6. Hook as defined in claim 5 **characterised in that** the guide elements consist in parallel guides (10b and 20b) on the two sides of the mobile plate (10) and the fixed plate (20), respectively.

7. Hook as defined in claim 1 **characterised in that** the connections means consist in a fastening screw (400) with horizontal axis that is inserted and slides within a vertical slot (100c) on the plate (100) fixed to the picture frame, while the other plate (200), that is to say the plate fixed to the nail on the wall, is

provided with a threaded hole (200c) where the fastening screw (400) is engaged.

8. Hook as defined in claim 7 **characterised in that** the guide elements consist in two vertical guides (100b and 200b) on the two sides of the mobile plate (100) and the fixed plate (200), respectively.

9. Hook as defined in claims 2 to 8 **characterised in that** the means used to fix the mobile plate (1 or 10 or 100) to the picture consist in one or more holes (1a or 10a or 100a) on the lower half-wing of the mobile plate (1 or 10 or 100).

10. Hook as defined in claims 2 to 8 **characterised in that** the means used to fix the mobile plate (1 or 10 or 100) to the picture consist in a hook (1d, 10d, 100d).

11. Hook as defined in the preceding claims **characterised in that** the mobile plate (1 or 10 or 100) is provided with a transversal connection step (5 or 50 or 500) between the lower half-wing and the upper half-wing, with such dimensions that the lower half-wing is coplanar to the fixed plate (2 or 20 or 200).

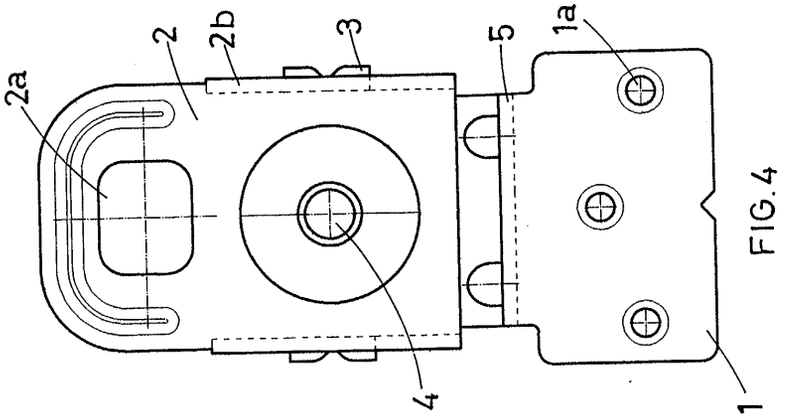

FIG.4

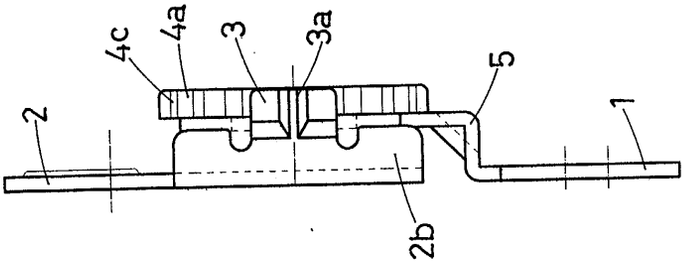

FIG.2

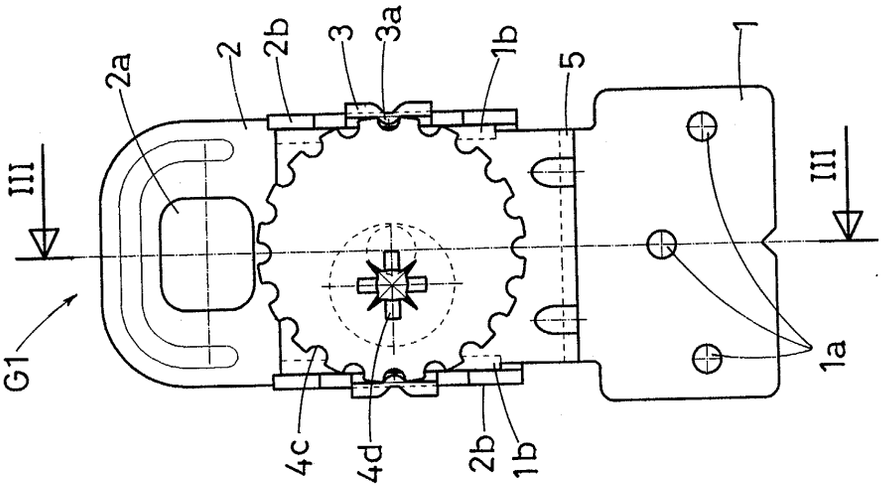

FIG. 1

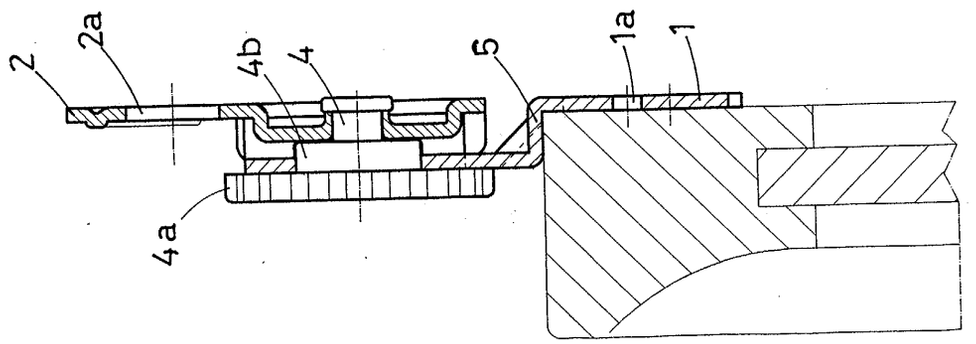

FIG. 3

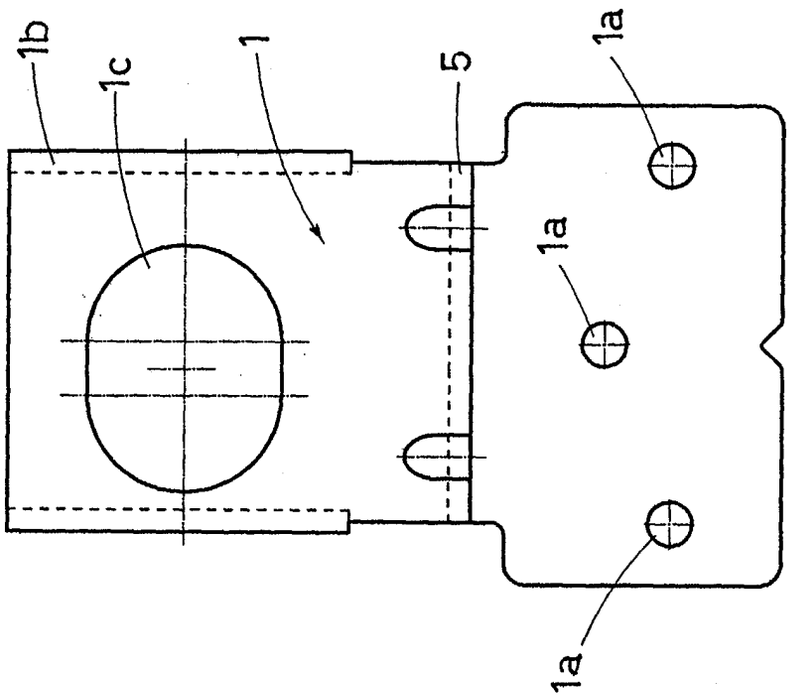

FIG.5

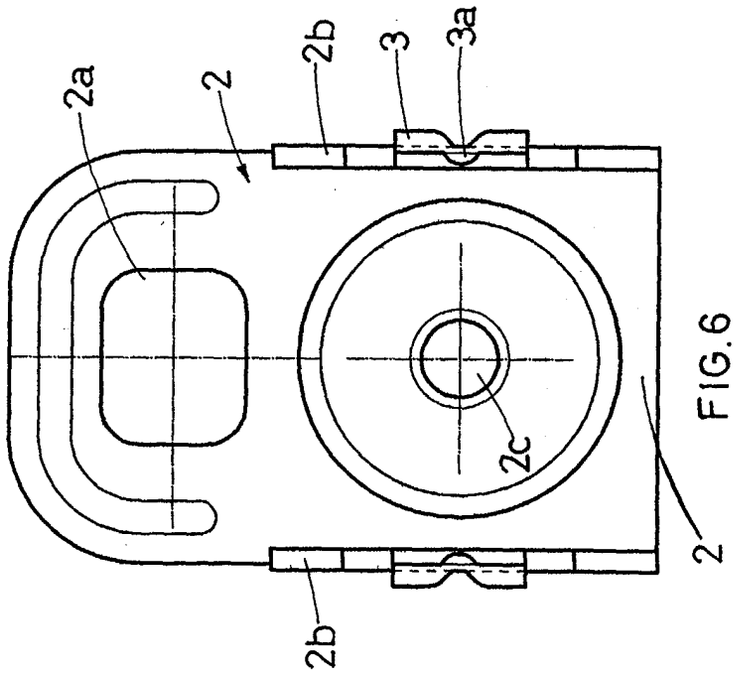

FIG.6

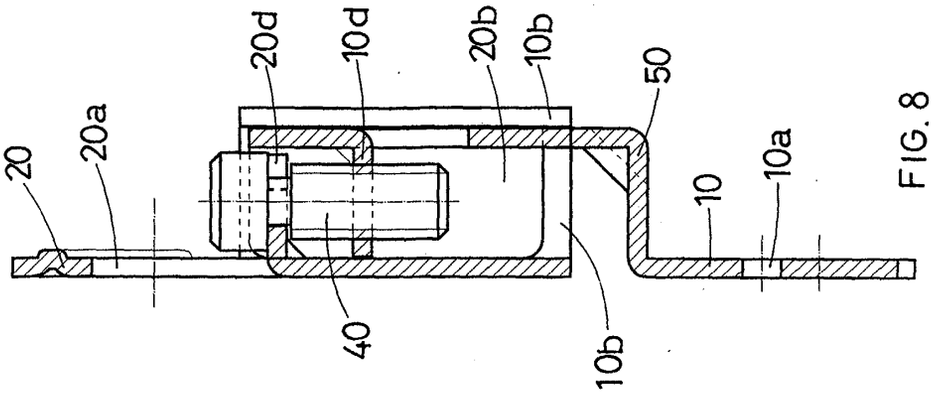
20
20a
20d
10d
20b
10b
50
10
10a
40
10b

FIG. 8

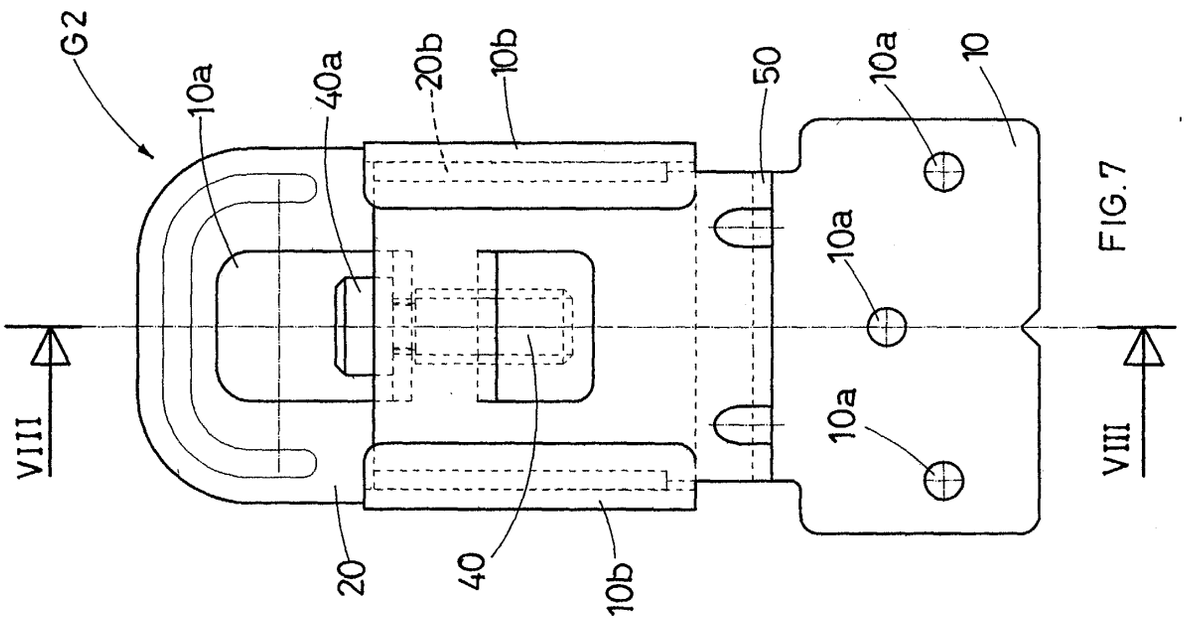
G2
10a
40a
20b
10b
50
10a
10
10a
10a
VIII
VIII
20
40
10b

FIG. 7

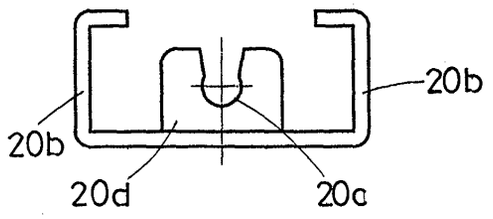

FIG. 9

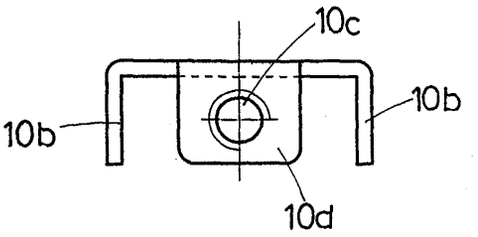

FIG. 10

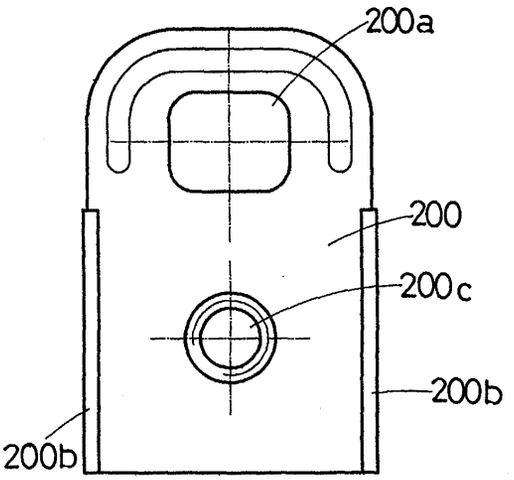

FIG. 13

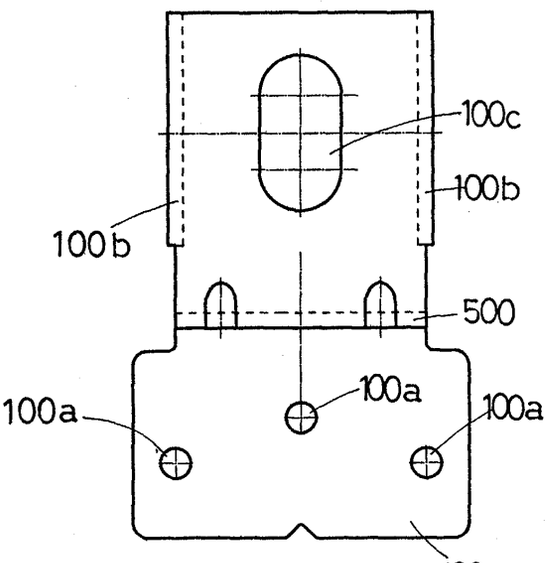

FIG. 14

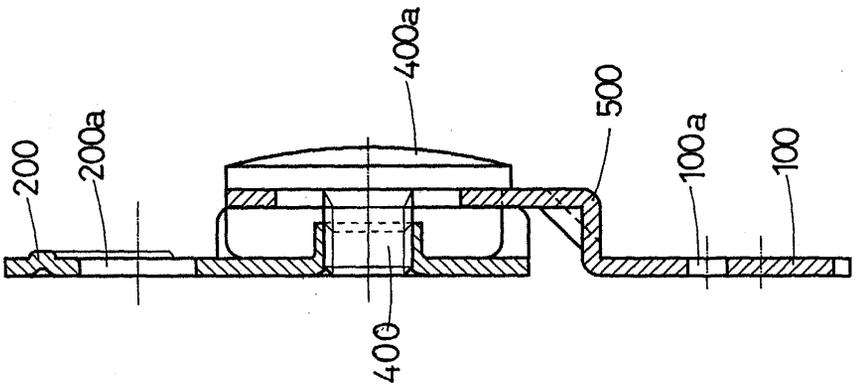
400a
500
200
200a
100a
100
400

FIG. 12

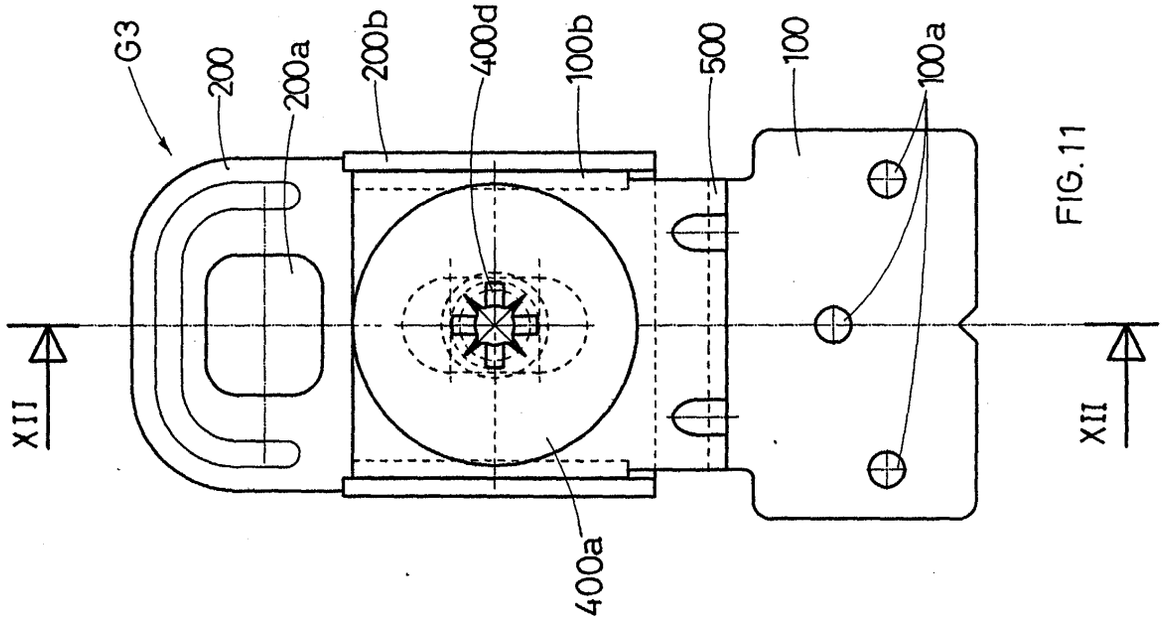
G3
200
200a
200b
400d
100b
500
100
100a
XII
XII
400a

FIG. 11

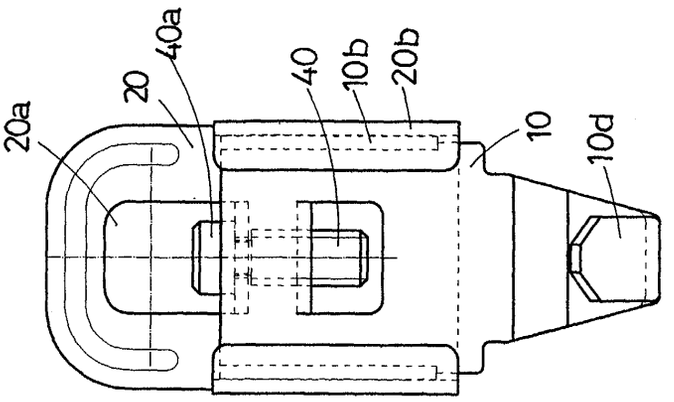

FIG.16

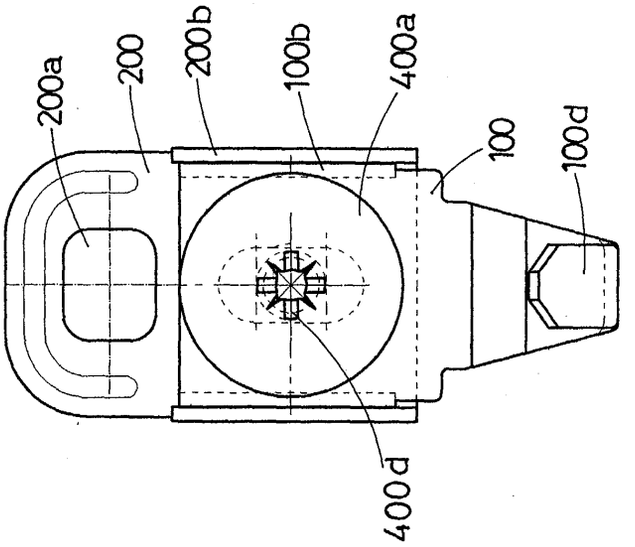

FIG.17

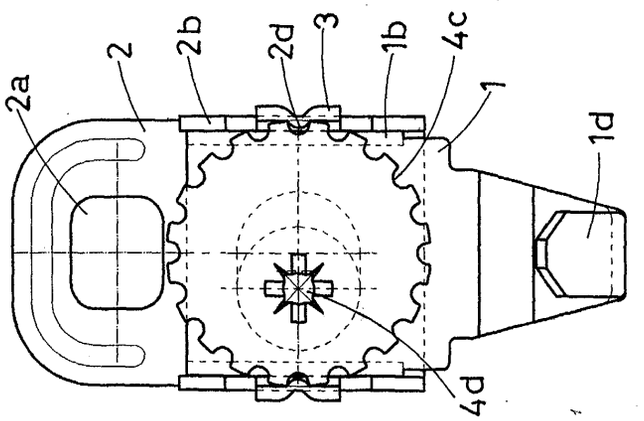

FIG.15