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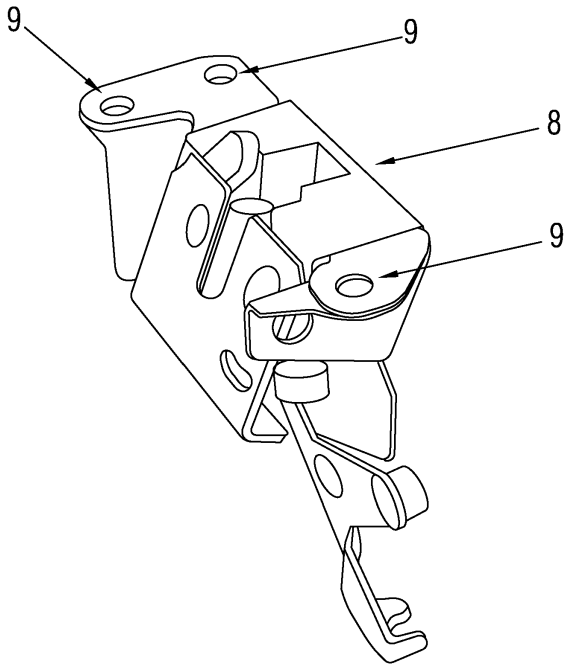
(54) DEVICE FOR INSTALLING LOCKS ON A PART

(57) The invention relates to a device for installing locks in a part, said locks comprising a central body and a securing hole prepared so that securing means can be inserted therein, wherein said device comprises positioning means configured to be inserted into an element of the part; a magnet; and perforation guide means comprising one hole configured to receive perforation means of a perforation apparatus, so that, once the positioning means are inserted into the element of the part, the projection of the perimeter of said hole over the part delimits the area of the part to be perforated by the perforation means and, so that, once the area of the part delimited by the projection of the perimeter of the hole is perforated, the perforation obtained is configured to receive at least a portion of the securing means.

FIG.1



EP 3 546 681 A1

Description

State of the art

[0001] The present invention refers to a device for installing locks in a part and, more specifically, in parts in the automotive sector, such as the front and/or rear doors and/or the centre pillar of a car.

Prior state of the art

[0002] In the automotive sector, it is common that once a specific part has been assembled, for example a door or the centre pillar of the vehicle, and even this part is already outside the assembly line or manufacturing centre, a lock must be installed thereon which comprises a central body and at least one securing hole.

[0003] For the installation of said locks, perforating a portion of the part is required so that through securing means which cross through both the perforated portion of the part and the securing hole of the locks, said locks stay joined to the part, and, in some cases, it is also necessary to cut out a portion of the part so that one area of the body of the lock is situated in the cut-out area of the part. Consequently, the installation of the mentioned locks requires maximum accuracy in the perforation and cutout of the part, both for a correct positioning of the lock and in order to not damage the part which is already manufactured and any damage it suffers could imply the new manufacturing thereof.

[0004] It should be noted that a problem caused by these different perforations and/or cutouts is the fact that when the part is already outside the assembly line thereof or of the manufacturing centres the very machinery or tools for assembly cannot be used, the use of external devices being necessary which implies an increase in the production expenses. In this manner, it must not be forgotten that the installation of such locks must be performed for a large number of parts for which reason it is even more necessary to limit the expenses for this installation.

[0005] At present, there are two main techniques for the installation of the aforementioned locks.

[0006] On the one hand, the most common solution is the use of robotic devices which are responsible for performing with maximum accuracy the perforations and/or cutouts necessary to install the lock in the part as well as the final positioning of said lock in the part. This solution entails the easy mechanisation thereof, resolving the problem of dealing with a large number of locks to be installed. The main drawback of this solution is that for the insertion of the lock one must go to specialised centres equipped with the corresponding robotic technology, greatly increasing production costs which in many cases reduce the business margin for this type of insertions to unsustainable minimums.

[0007] On the other hand, there is an alternative solution which is the use of templates to perform the perforations and/or cutouts on the certain area of the part wherein the lock must be installed. The main drawback of this solution is that the template is not placed precisely on the certain areas to be perforated and/or cut out of the part for which reason the area finally delimited by the template and the areas finally perforated and/or cut out of the part do not correspond to the areas that should have been perforated and/or cut out for a correct installation of the lock. That is to say, it is common for the perforated areas of the part to not be aligned with the securing holes for which reason when the lock is installed on the part it is not perfectly joined to it through the securing means.

[0008] Likewise, another drawback is the movement of the template at the time that it is perforating and/or cutting out the corresponding area of the part, thereby leading to an erroneous perforation and/or cutting out of the area of the part and poor installation of the lock. Furthermore, another drawback of this template is the fact that the continuous use thereof leads to high wear or deterioration, affecting the accuracy and position of the perforations and/or cutouts of the area of the part. In a variant of this solution, the template may comprise certain mechanical gripping systems for the part, such as mechanical grippers, in order to ensure the position of the template and improve the accuracy of the perforations and/or cutouts. However, the main drawback of these gripping systems is that they can damage the part, especially in cases in which said part is made of metal, and it should not be forgotten that in some cases the mentioned part may be the same body of the vehicle.

Description of the invention

[0009] The main purpose of the present invention is to solve all the aforementioned drawbacks.

[0010] Consequently, the present invention has to solve the technical problem of installing a lock in a part in a precise manner and without damaging said part, it must be a solution that is cost-effective and economically viable and easily machinable so that the solution can be applied to multiple parts.

[0011] As mentioned previously, the locks to be installed on the part are of the type comprising at least one central body and a securing hole prepared so that at least one set of securing means can be inserted therein. Preferably, the type of locks to be installed are those typical and common in the automotive industry.

[0012] In turn, the device for installing locks in a part according to the invention comprises at least one set of positioning means, a magnet and perforation guide means.

[0013] The positioning means are configured to be inserted into at least one element of the part adapted to receive said positioning means in such a manner that once the positioning means are inserted into said element of the part, the device delimits an area of the part over which at least a portion of the lock must be installed,

whether it be the securing holes and/or a portion of the central body.

[0014] In a preferred embodiment, the device can comprise a plurality of positioning means.

[0015] Preferably, the positioning means are a protrusion jutting out from the device.

[0016] The main purpose of the magnet is to further ensure the positioning of the device on the part, especially in cases wherein the part is made of metal.

[0017] Preferably, the magnets are inserted into the same device in blind and/or through holes prepared to do so in such a manner that the length of the magnet is less than or equal to the depth of the hole, thereby preventing the magnet from jutting out from the device and being able to damage the part whereon the device is installed.

[0018] The perforation guide means comprise at least one hole, which can be a blind and/or through hole, configured to receive perforation means of an external perforation apparatus, so that, once the positioning means are inserted into the element of the part, the projection of the perimeter of said hole over the part delimits the area of the part to be perforated by the perforation means and, so that, once the area of the part delimited by the projection of the perimeter of the hole is perforated, the perforation obtained is configured to receive at least a portion of the securing means. Preferably, the guide means are circular or oblong metal bushings comprising a hole.

[0019] In this manner, what the user, in order to be able to install the lock on the part, must do is, first, position the device for installing locks in a part according to the invention on the part by inserting the positioning means into the elements of the part prepared to receive them and let the magnets act on the part. Thereafter, the user can perforate the area of the part delimited by the perimeter of the holes of the perforation guide means by introducing the perforation means of an external perforation apparatus into said holes. Once the different perforations have been obtained, the user can join the lock to the part by placing the holes for securing the part in the perimeters of the perforations obtained and passing securing means through the aforementioned perforations and inserting them into the securing holes of the perforations prepared to receive said securing means.

[0020] Preferably, the securing means are pin elements configured to cross through the perforations made in the part and be introduced into the securing holes of the lock.

[0021] In a preferred embodiment of the device according to the invention, it further comprises a delimiting hole configured to receive cutting means of a cutting apparatus, so that, once the positioning means are inserted into the element of the part, the projection of the perimeter of said delimiting hole on the part defines an area that at least includes the area to be cut out by the cutting means and, so that, once this area is cut out, the obtained cutout is configured to receive at least a portion of the central body of the lock.

[0022] This preferred embodiment is especially useful in cases wherein a portion of the body of the lock must stay inserted into the part. Then, the delimiting holes have the shape of the portions of the body of the lock that are to stay inserted into the part in such a manner that once at least one area of the part that falls within the projection of the perimeters of the holes on the part has been cut out, the mentioned portions of the body of the lock can be inserted into said cut-out areas of the part.

[0023] In this preferred embodiment, in order to be able to install the lock in the part, the user must, first of all, as in the previous embodiment of the device, position the device for installing locks in a part according to the invention on the part by inserting the positioning means into the elements of the part prepared to receive them and allowing the magnets to act on the part. Thereafter, the user may choose to perforate the area of the part delimited by the projection of the perimeter of the holes of the perforation guide means on the part by introducing the perforation means of an external perforation apparatus in said holes or even cutting out the area of the part delimited by the projection of the perimeter of the holes on the part by introducing the cutting means of a cutting apparatus into said hole. In the case of the user deciding to perforate, then they must perform the aforementioned cutouts and, in the case of the user deciding to cut first, they must perform the perforations afterwards. Once the different perforations and cutouts have been obtained, the user can join the lock to the part by situating the portions of the body of the lock that have to stay in the cut-out areas in the aforementioned area and the securing holes of the part in the perimeters of the perforations obtained in order to then pass the securing means through said perforations and insert them into the securing holes of the lock prepared to receive said securing means.

[0024] The device for installing locks in a part according to the invention can be made of any material that does not damage the part but, preferably, is made of plastic.

[0025] As mentioned above, an object of this invention is to offer maximum accuracy while ensuring in the best possible manner to not damage the device for installing locks in a part according to the invention. In this sense, in this last preferred embodiment for performing the cutouts of the portions of the areas which fall within the projections of the perimeters of the holes of the device, extreme care must be taken not to damage or cut portions of the device.

[0026] For this purpose, a safety device for the cutout is useful which comprises a protrusion with a hole prepared so that it can be inserted into the cutting means of a cutting device and dimensioned in order to define a safety distance between the cutting means of the cutting device and the portion of the device for installing locks in a part according to the invention delimited by the perimeter of the hole.

[0027] This means that the user, in order to be able to cut out a portion of the areas delimited by the projections of the perimeters of the holes on the part, can introduce the cutting means directly or introduce the protrusion of the safety device into the cutting means. In this case, the cut-out areas are spaced apart from the projection of the perimeter of the hole on the part.

[0028] As mentioned above, an object of the present invention is to provide easy mechanisation of the installation of locks in parts. For this reason, it can be useful to have a system comprising a device for installing locks in a part according to the invention, a safety device and a cutting apparatus. In this manner, the user, together with an external perforation apparatus can quickly install locks on the parts.

Brief description of the drawings

[0029] The foregoing and other advantages and features will be more fully understood from the following detailed description of exemplary embodiments with reference to the accompanying drawings, which should be considered by way of illustration and not limitation, in which:

- Fig. 1 represents an example of the type of lock to be installed on a part.
- Fig. 2 shows front, back and side views of a basic embodiment of the device for installing locks in a part according to the invention.
- Fig. 3 illustrates the front, back and side views of a preferred embodiment of the device for installing locks in a part according to the invention.
- Fig. 4 represents the application of the device illustrated in fig. 3 on the door of a car.
- Fig. 5 shows a cutting safety device and a cutting device.

Detailed description of an embodiment

[0030] Fig. 1 shows an example of the type of lock, common in the automotive sector, to be installed on a certain part.

[0031] This lock to be installed on the part is of the type comprising at least one central body (8) and securing holes (9) which enable said lock to be joined to the part whereon it is to be installed through securing means. Preferably, the part whereon the lock is to be installed are the side doors and/or the centre pillar of a car.

[0032] Fig. 2 shows front, back and side views of a basic embodiment of the device (1) for installing locks in a part according to the invention. Preferably, the part whereon said basic embodiments of the device (1) are to be installed is the centre pillar of a car.

[0033] As seen, this device (1) comprises positioning means (2), magnets (3) and perforation guide means (4).

[0034] The device (1) has a shape suitable for the part whereon it must be situated, in this case being a polyhedral shape with a certain thickness.

[0035] The positioning means (2) are configured to be inserted into elements of the centre pillar of the car adapted to receive said positioning means (2). In this basic embodiment, the positioning means (2) are rectangular or polyhedral prism-shaped protuberances situated on the back face and on the back and side faces of the device (1). However, the positioning means (2) can be situated on any face of the device (1).

[0036] In this basic embodiment, the magnets (3) are inserted into blind holes of the side face of the device (1) and in blind holes of the positioning means (2) which are between the back face and the side face. However, said magnets (3) can be located on any portion of the front, back or side faces.

[0037] It should be taken into account that in this basic embodiment the magnets (3) are inserted into blind holes and that they are configured so as not to jut out from said holes in order to prevent damage to the centre pillar.

[0038] The perforation guide means (4), in this basic embodiment, are metal bushings with a through hole (5) situated in such a manner that when the positioning means (2) are inserted into the elements of the centre pillar adapted to receive them and the area of the centre pillar delimited by the perimeter of the hole (5) of the metal bushing is perforated, the perforation obtained delimits the perimeter of the part whereon the securing hole (9) of the lock must be situated so that said lock can be joined to the part through the securing means.

[0039] Fig. 3 shows front, back and side views of a preferred embodiment of the device (1) for installing locks in a part according to the invention. Preferably, the parts whereon these embodiments of the device (1) are to be installed are the side doors of a car. In particular, said figure shows a device (1) for the left door and another device (1) for the right door which are symmetrical with respect to each other in relation to an imaginary vertical axis situated in the longitudinal space existing between them in the figures.

[0040] Thus, Fig. 3a shows the front faces of the devices (1) according to the invention, the device (1) on the left being the one which would be used for the left door and the device (1) on the right being the one which would be used for the right door; Fig. 3b illustrates the back faces of the devices (1) according to the invention, the device (1) on the left being that which would be used for the left door and the device (1) on the right being that would be used for the right door; and Fig. 3c represents the side faces of the devices (1) according to the invention, the device (1) on the left being the one which would be used for the left door and the device (1) on the right being the one which would be used for the right door.

[0041] As seen, these devices (1) comprise positioning means (2), magnets (3), perforation guide means (4) and a delimiting hole (6).

[0042] The device (1) has a shape suitable for the part whereon it must be situated, being in this case that of a rectangular prism of a certain thickness and with a small

cutout on one of the side faces thereof.

[0043] The positioning means (2) are prepared to be inserted into elements of the side door adapted to receive said positioning means (2). In this preferred embodiment, the positioning means (2) are rectangular prism-shaped protrusions situated on the back face. However, the positioning means (2) can be situated on any face of the device (1).

[0044] In this preferred embodiment, the magnets (3) are inserted into blind holes of the side face of the device (1). However, said magnets (3) can be located on any portion of the front, back or side faces.

[0045] The perforation guide means (4), in this preferred embodiment, are oblong metal bushings with a through hole (5) situated in such a manner that when the positioning means (2) are inserted into the elements prepared to receive them of the corresponding side door and the area of the side door delimited by the perimeter of the hole (5) of the metal bushing is perforated, the perforation obtained delimits the perimeter of the part whereon the securing hole (9) of the lock must be situated so that said lock can be joined to the corresponding side door through the securing means.

[0046] The delimiting hole (6) is configured so that, once the positioning means (2) are inserted into the elements prepared to receive them from the corresponding side door, the projection of the perimeter of said delimiting hole (6) on the part defines an area which at least includes the area to be cut out of the side door such that the perimeter of the cutout of the side door obtained delimits the area prepared to receive at least one portion of the central body (8) of the lock. In this preferred embodiment, the hole (6) has an inverted T shape since the portion of the central body (8) of the lock that must be visible once installed on the side door has this specific shape. However, the hole (6) can have any shape suitable for the shape that must be given to the cutout depending on the portion of the central body (8) of the lock that must be visible once it is situated on the side door.

[0047] Fig. 4 shows the application of the device (1) of Fig. 3 for the left door in a left door of a car such that the front face of the device (1) is the one facing outwards. In said figure, the remaining cutout with the shape of the hole (6) is already shown.

[0048] Fig. 5 shows a cutting device (20) and a cutting safety device (10).

[0049] The cutting device (20) comprises perforation means (21) prepared to be able to cut out at least, once the positioning means (2) of the device (1) are inserted into the elements prepared to receive them of the part, an area of the part that is inside the area of the part delimited by the projection of the perimeter of the hole (6) of the device (1) on the part. Said cutting device (20) can be any of the ones common in the sector of the art.

[0050] The cutting safety device (10) comprises a protrusion (11) with a hole (12) prepared so that it can be inserted into the cutting means (21) of the cutting device (20) and sized to define a safety distance between the cutting means (21) of the cutting device (20) and the portion of the device (1) delimited by the perimeter of the hole (6). In this preferred embodiment, the cutting safety device (10) has a disc shape in which the protrusion (11) and the hole (12) are defined through a circular crown prepared so that the cutting means (21) of the cutting device (20) can move through it.

[0051] In Fig. 4 it can be seen that the cutout of the side door with an inverted T shape is smaller than the projection of the perimeter of the hole (6) with an inverted T shape since for said cutout a cut-off safety device (10) has been used inserted into the cutting means (21) of a cutting device (20).

[0052] A person skilled in the art will be able to carry out modifications and variations based on the embodiments shown and described without departing from the scope of the present invention as defined in the attached claims.

Claims

1. A device (1) for installing locks in a part, said locks comprising at least one central body (8) and a securing hole (9) prepared so that at least one set of securing means can be inserted therein, **characterised in that** the device for installing locks in a part comprises at least:

    - Positioning means (2) configured to be inserted into at least one element of the part adapted to receive said positioning means (2);
    - A magnet (3);
    - Perforation guide means (4) comprising at least one hole (5) configured to receive perforation means of a perforation apparatus, so that, once the positioning means (2) are inserted into the element of the part, the projection of the perimeter of said hole (5) over the part delimits the area of the part to be perforated by the perforation means and, so that, once the area of the part delimited by the projection of the perimeter of the hole (5) is perforated, the perforation obtained is configured to receive at least a portion of the securing means.

2. The device (1) for installing locks in a part according to the preceding claim further comprising a delimiting hole (6) configured to receive cutting means (21) of a cutting apparatus (20), so that, once the positioning means are inserted into the element of the part, the projection of the perimeter of said delimiting hole (6) on the part defines an area that at least includes the area to be cut out by the cutting means (21) and, so that, once this area is cut out, the obtained cutout is configured to receive at least a portion of the central body (8) of the lock.

3. The device (1) for installing locks in a part according to any of the preceding claims, wherein the magnet (3) is inserted into a hole of the device prepared to receive said magnet (3).

4. The device (1) for installing locks in a part according to the preceding claim, wherein the length of the magnet (3) is less than or equal to the depth of the hole of the device prepared to receive said magnet (3).

5. The device (1) for installing locks in a part according to any of the preceding claims, wherein at least one magnet (3) is situated in at least one set of positioning means (2).

6. The device (1) for installing locks according to any of the preceding claims wherein said device is made of plastic material.

7. The device (1) for installing locks in a part according to any of the preceding claims, wherein at least one set of positioning means (2) is a protrusion jutting out from the device.

8. The device (1) for installing locks in a part according to any of the preceding claims, wherein at least one set of guide means (4) is a metal bushing.

9. The device (1) for installing locks in a part according to the preceding claim, wherein the guide means (4) are an oblong or circular metal bushing.

FIG.1

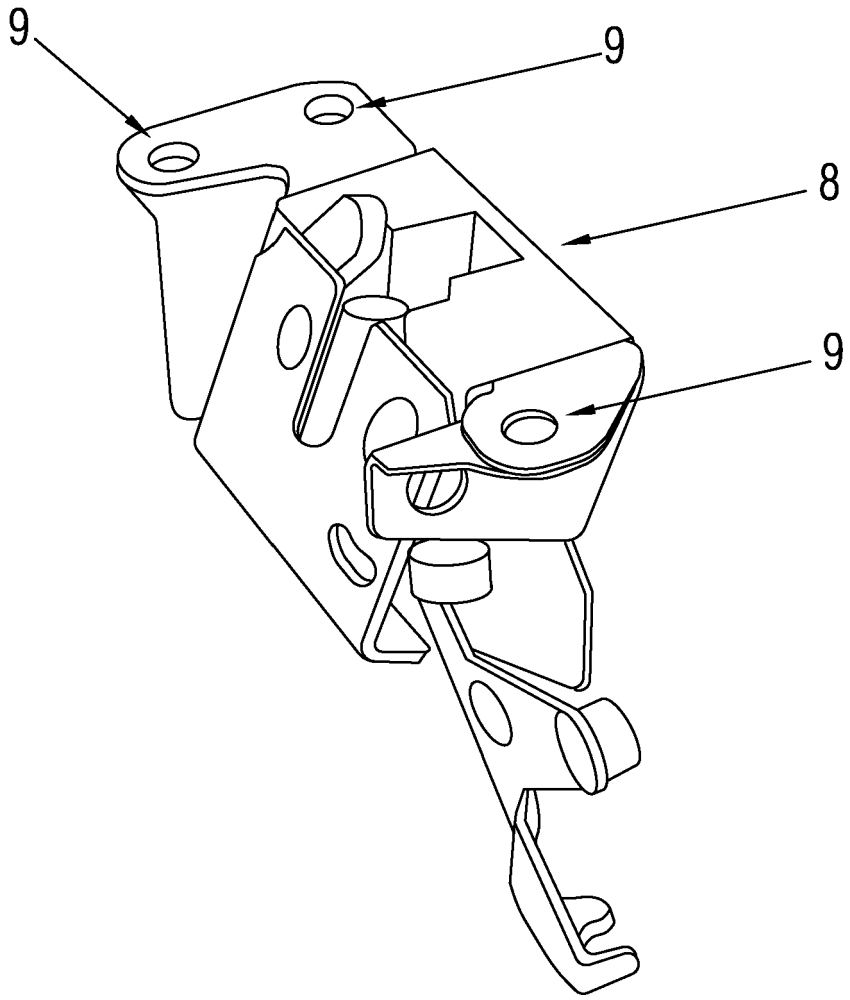


FIG.2a

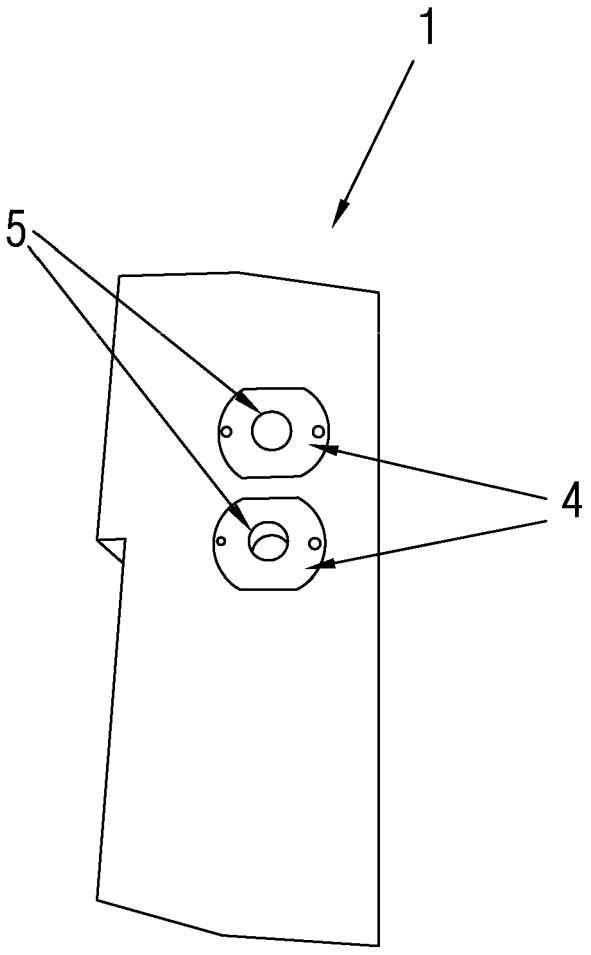


FIG.2b

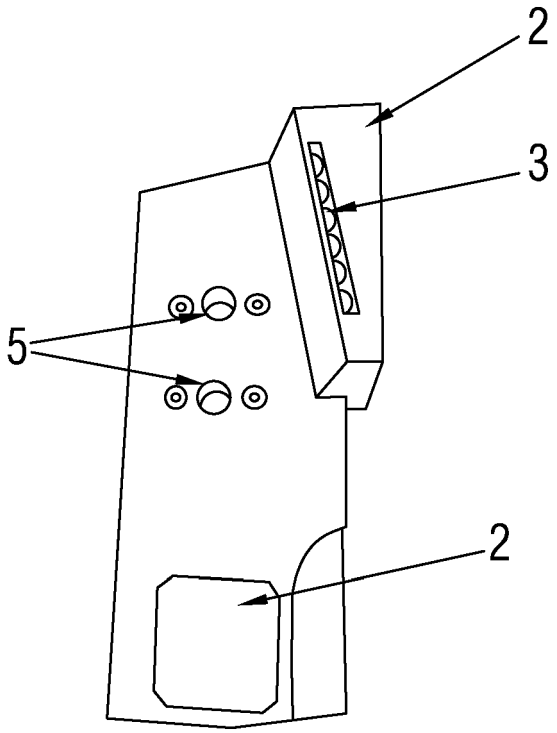


FIG.2c

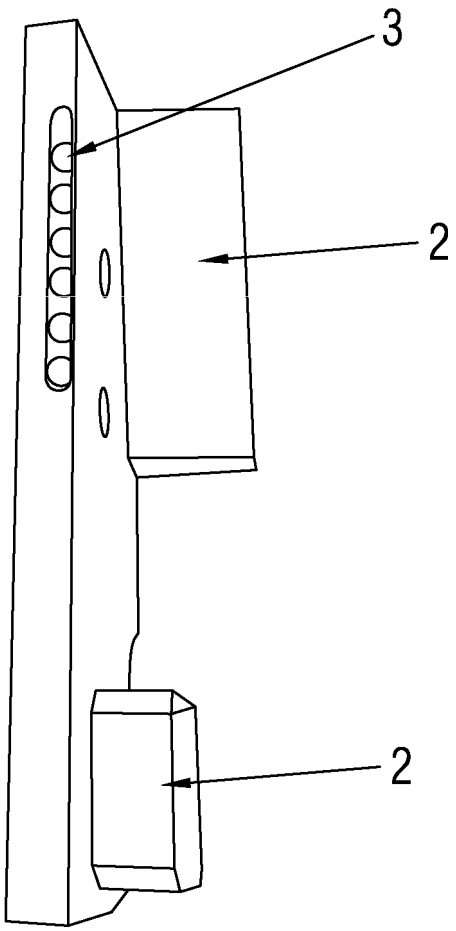


FIG.3a

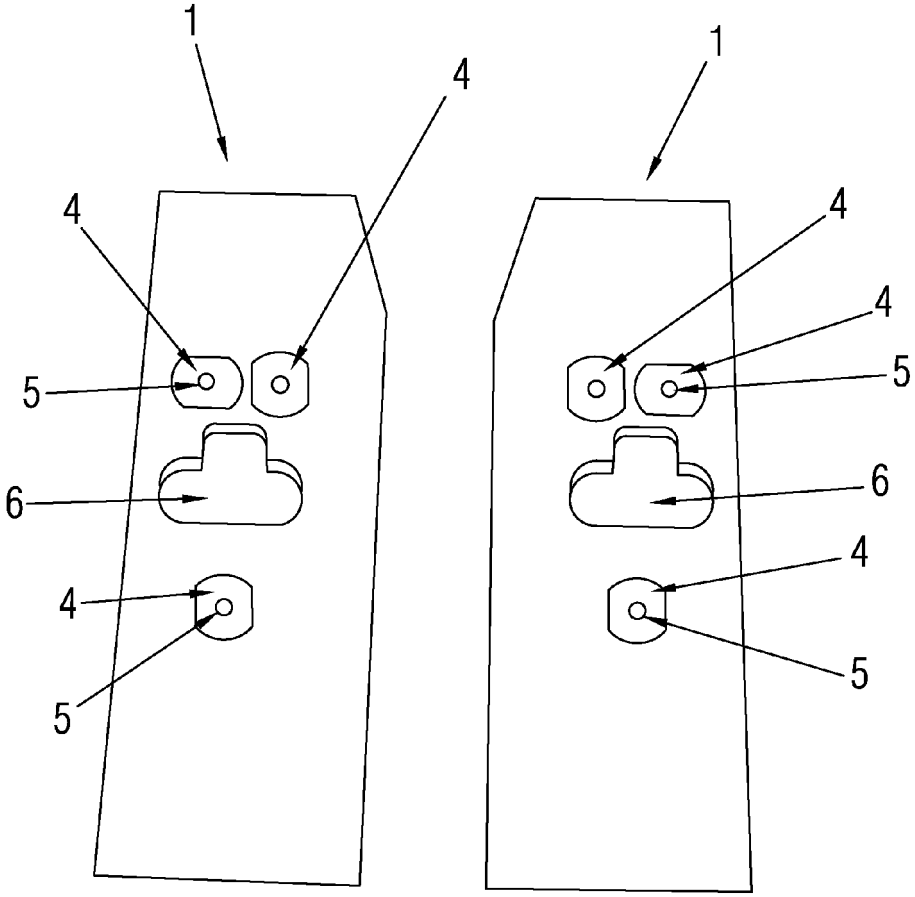


FIG.3b

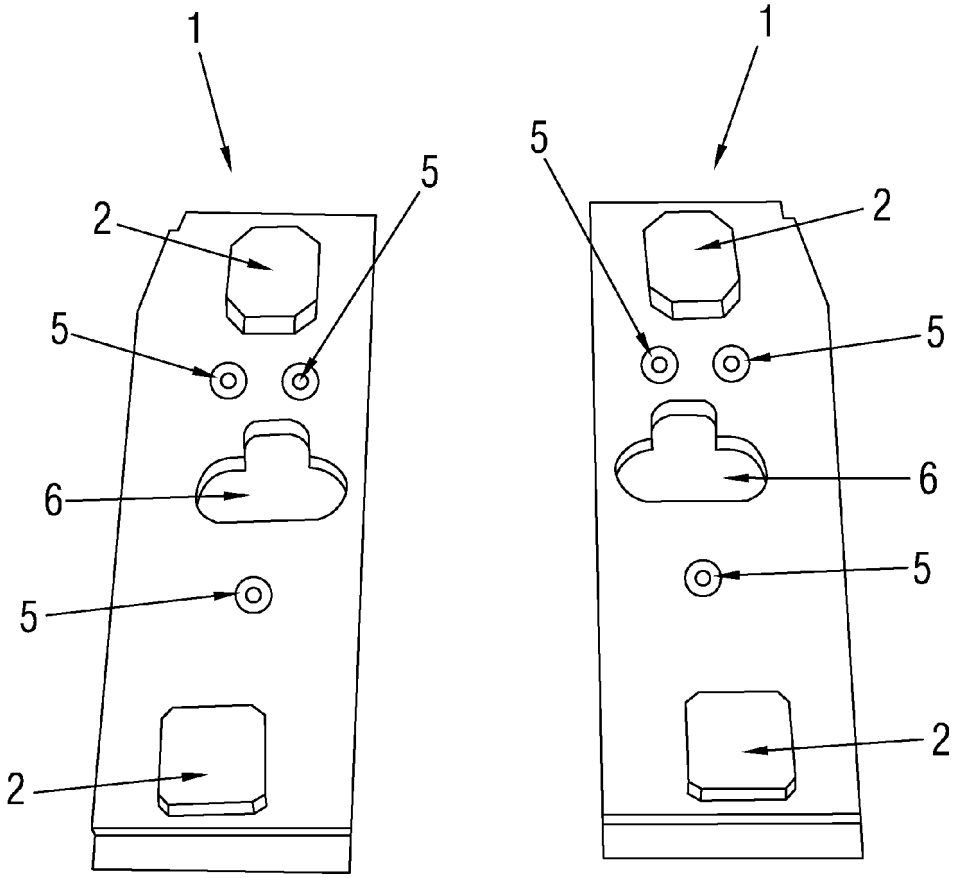


FIG.3c

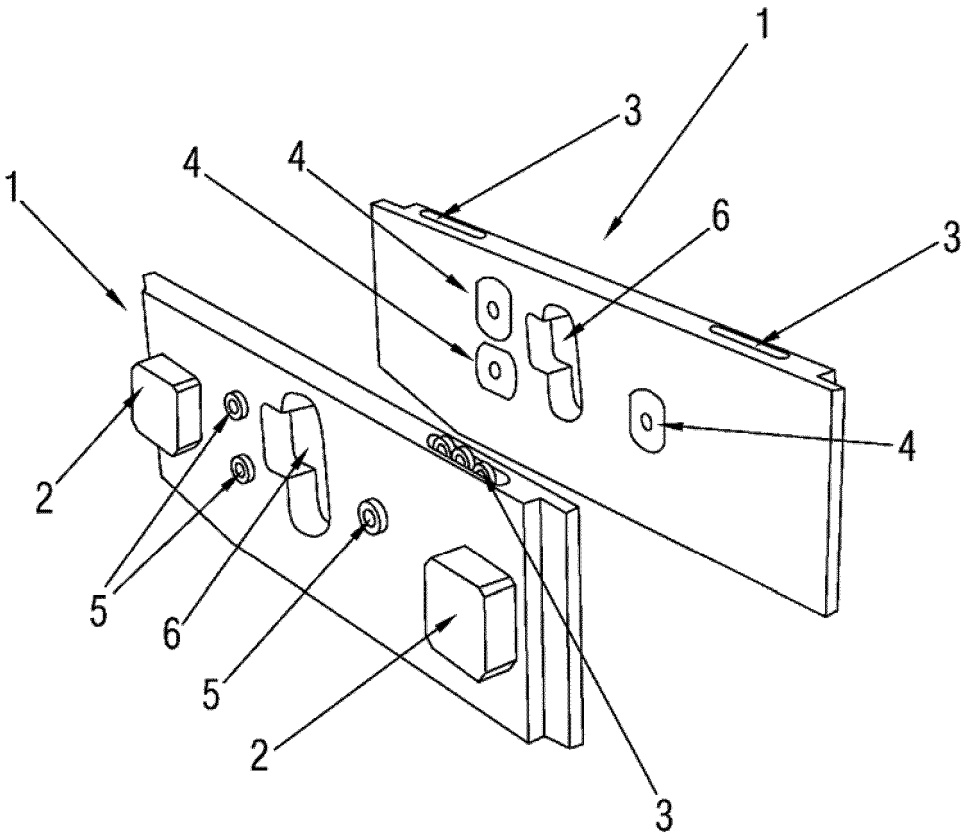


FIG.4

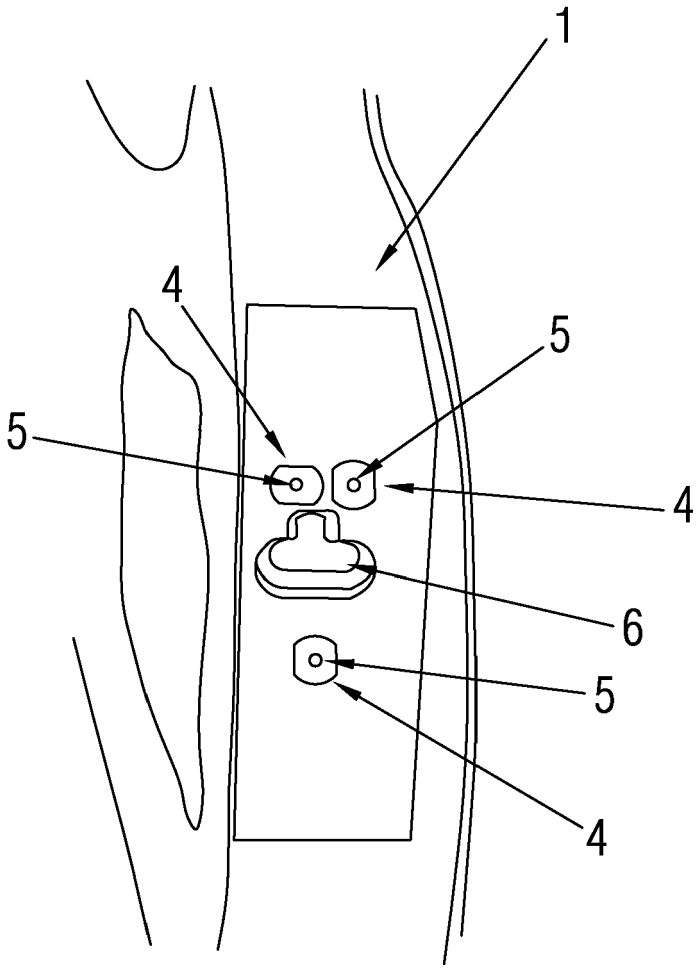
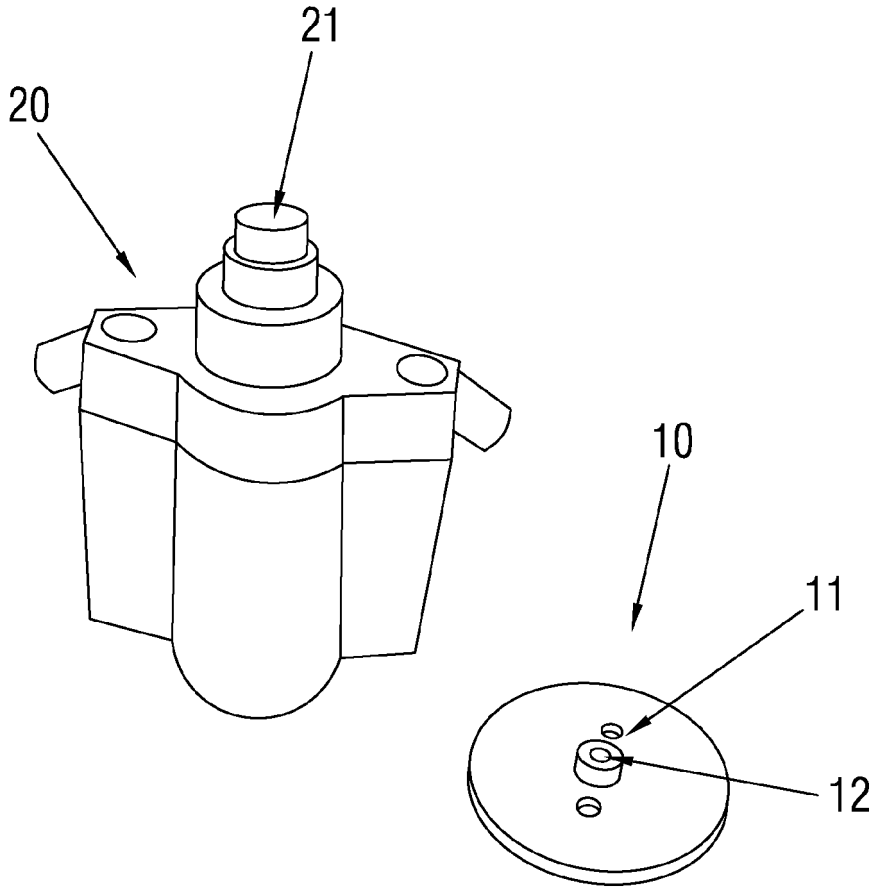


FIG.5



INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2017/070753

A. CLASSIFICATION OF SUBJECT MATTER

E05B79/04 (2014.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2015059155 A1 (DUONG HUY KYLE ET AL.) 05/03/2015, paragraphs [0010]-[0043]; figures	1-9
A	US 6029335 A (HUI ANNA ET AL.) 29/02/2000, column 2, line 26-column 4, line 52; figures	1-9
A	US 6324948 B1 (KAVC ANDREW R ET AL.) 04/12/2001, description; figures	1-9
A	US 4989313 A (DZURKO THOMAS A ET AL.) 05/02/1991, description; figures	1-9
A	US 6279218 B1 (LEZUCH LAWRENCE J ET AL.) 28/08/2001, description; figures	1-9
A	DE 102012017624 A1 (DAIMLER AG) 21/03/2013, the whole document	1-9

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
02/02/2018	**(06/02/2018)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer P. López Unceta Telephone No. 91 3495535

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ES2017/070753

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
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