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(54) **A SHELF ELECTRICAL SUPPLY AND SHELF ELECTRICAL SUPPLY SYSTEM HAVING SAME**

(57) A shelf electrical supply (50) and its shelf electrical supply system (100) include a bottom cover (51), a top cover (52) disposed on the bottom cover (51), positive and negative wires (53,54) sandwiched between the bottom cover (51) and the top cover (52) and insulated from each other, and positive and negative power contactors (55,56) sandwiched between the bottom cover (51) and the top cover (52). The positive and negative power contactors respectively include a positive and a negative sleeve (551,561), and two positive and negative pairs of superposed magnets (552,562) respectively arranged in the positive sleeve and the negative sleeve (551,561). The two magnets of each pair (552,562) are mutually exclusive and respectively located between the positive and negative protruding portions (553,563) and the top cover (52). The positive and negative extensions respectively protrude the protruding holes (512,513) of the positive and negative contactors under the repulsive force of the two positive and negative magnets (552,562). The assembly of the carrier arm (40) can be completed when the carrier arm (40) of the shelf electrical supply system (100) is inserted into the insertion hole (11) of the column (10) so that the impact of the tolerance is minimized when assembling the column (10) and the carrier arm.

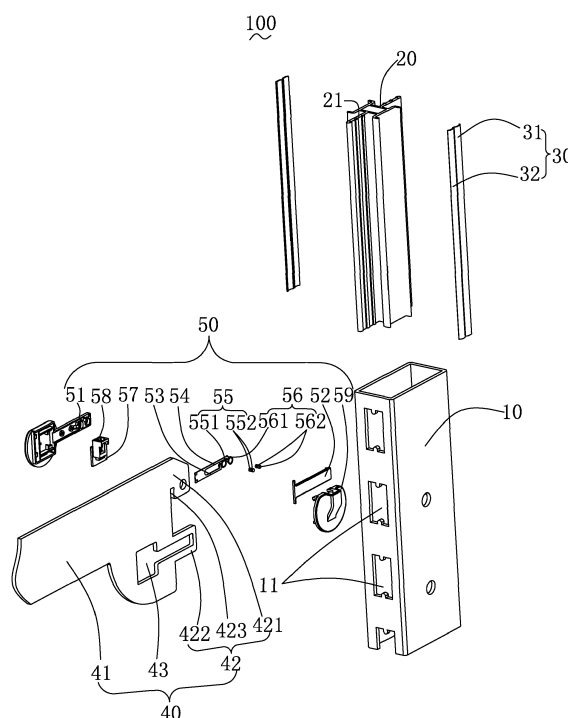


FIG. 1

Description

CROSS-REFERENCE TO A RELATED APPLICATION

[0001] This application claims priority to a Chinese Patent Application No. CN 201710256033.6, filed on April 19, 2017.

FIELD OF THE TECHNOLOGY

[0002] The present invention relates to a shelf system, with particular emphasis on a shelf electrical supply and its shelf electrical supply system.

BACKGROUND

[0003] The use range of shelf is very wide, such as in shopping malls, logistics storage, factory warehouses etc.,. These occasions need shelves to place the goods which are being sold or not immediately used. In the use of these shelves, lighting is necessary, especially in the shopping malls, lighting requirements are particularly high, such as space-saving, safe, easy assembly, aesthetics and so on.

[0004] In the prior art, the power supply for supplying the LED lamps disposed on the shelf irradiation surface is generally arranged on the back surface of the shelf. So the wires need to pass through the LED lamps or need to be wound from the shelf irradiation surface to make the LED lamps reach the back surface of the shelf and then connect to the power supply. On the one hand, such a power supply arrangement in the prior art leads to be inconvenient to wind wires, more wiring and clutter so it is unfavorable for maintenance and aesthetic effects, thereby it will affect the effect of commodity irradiation. On the other hand, since the shelves are required to be universally versatile and capable of placing different kinds of products, the installation positions of the shelves that need to be placed on the shelves for placing the products can be changed accordingly. For example, when necessary the shelves need to be removed or laminates need to be replaced. A patent whose application is No. 201520163602.9 and whose name is shelf electrical supply system discloses a shelf to solve the above technical problems. However, the power plug-in provided on the support arm of the shelf protrudes from the side where the support arm is located, and usually to make the shelf beautiful the tolerances of the components including the post, the back board and the like are small but the tolerances still exist. Therefore, when there is a slight error in the back board the installation may be difficult due to the power plug-in, which may cause inconvenience to the user.

SUMMARY OF THE INVENTION

[0005] Therefore, it is necessary to provide a shelf electrical supply and its shelf electrical supply system

that are not affected by the tolerances of the components of the shelf.

[0006] A shelf electrical supply, comprising: a bottom cover, a top cover disposed on the bottom cover, positive and negative wires sandwiched between the bottom cover and the top cover and insulated from each other, and positive and negative power contactors sandwiched between the bottom cover and the top cover, the bottom cover comprising a body, protruding holes of the positive and negative contactors alternately disposed at ends of the body, a wire accommodating groove arranged on the body; the positive and negative wires being held in the wire accommodating groove; the positive and negative power contactors respectively comprising a positive and a negative sleeves, and two superposed positive and negative magnets respectively arranged in the positive and the negative sleeves; the positive and the negative sleeves respectively comprising a positive and a negative protruding portion, a positive and a negative clamping portion respectively electrically connected with the positive and negative wires; the positive and negative clamping portions being located between the bottom cover and the top cover; two magnets held in the positive and the negative sleeves being mutually exclusive and being located between the positive and negative protruding portions and the top cover; the positive and negative protruding portions respectively protruding the protruding holes of the positive and negative contactors under the repulsive force of the two positive and negative magnets held in the positive and negative sleeves.

[0007] Further, the bottom cover further comprises a circuit board accommodating end located at the another end of the body, and the shelf electrical supply comprises a circuit board held in the accommodating end of the circuit board, the circuit board is electrically connected to the positive and negative wires.

[0008] Further, the shelf electrical supply further comprises a power plug-in assembly disposed on the circuit board, and an end cover mounted on the circuit board accommodating end.

[0009] Further, the end cover comprises an accommodating cavity, and the power plug-in assembly is disposed in the accommodating cavity.

[0010] Further, the positive and negative sleeves are a frustum-shaped sleeve.

[0011] Further, the positive and negative wires are flexible enameled wires.

[0012] Further, the top cover comprises a groove for holding the positive and negative sleeves.

[0013] Further, the top cover further comprises two magnet accommodating cavities disposed in the groove, each of the magnet accommodating cavities is configured to fix one of the two magnets respectively held in the positive and negative sleeves.

[0014] Further, the positive and negative clamping portions are clamped between the top cover and the protruding holes of the positive and negative contactors of the bottom cover.

[0015] A shelf electrical supply system comprises at least one carrier arm disposed on the column, and at least one shelf electrical supply as described above disposed on the carrier arm. The carrier arm comprises an opening for setting the shelf electrical supply.

[0016] Compared with the prior art, the assembly of the carrier arm can be completed without being influenced by the electrical supply device when the carrier arm of the shelf electrical supply system is inserted into the slotted hole of the column so that the impact of the tolerance is minimized when assembling the column, the back board and the carrier arm.

DETAILED DESCRIPTION OF THE DRAWINGS

[0017] The drawings described herein are intended to promote a further understanding of the present invention, as follows:

FIG. 1 is an exploded structure diagram of the shelf electrical supply system provided by the present invention.

FIG. 2 is an exploded structure diagram of the shelf electrical supply in the shelf electrical supply system shown in FIG. 1.

FIG. 3 is an exploded structure diagram of the shelf electrical supply in the shelf electrical supply system in another direction shown in FIG. 2.

FIG. 4 is an assembly structure diagram of the shelf electrical supply system shown in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] The present application is illustrated by way of the following detailed description based on of the accompanying drawings. It should be noted that illustration to the embodiment in this application is not intended to limit the invention.

[0019] Referring to FIG. 1 to FIG. 4, FIG. 1 is an exploded structure diagram of the shelf electrical supply system provided by the present invention. The shelf electrical supply system 100 comprises at least one column 10, a power supply strip support frame 20 fixed in each of the column 10, a power supply strip 30 disposed in each of the power supply strip support frames 20, at least carrier arm 40 disposed on the column 10, and shelf electrical supplies 50 provided on the at least one carrier arm 40. It is well-known that for a complete shelf, it also comprises some load-bearing elements such as laminates and the like, information signs, lighting fixtures, the base for inserting the columns 10, back boards, etc.. The technology is well-known to those skilled in the art and will not be repeated here.

[0020] The column 10 is a hollow cylinder and comprises at least one row of insertion holes 11. Each row

of insertion holes 11 comprises a plurality of insertion holes 11. It is understandable that the shelf electrical supply system 100 comprises at least two columns 10. The two columns 10 are vertically arranged side by side, the base are respectively horizontally disposed at the bottom of the two columns 10. Of course, when the shelf electrical supply system 100 comprises more than three columns 10, the columns may not be aligned in a straight line, and the columns may also be directly mounted on the ground or on a wall surface. When the shelf is mounted on a wall, the columns 10 can be installed either directly or via a suspension, for example by a horizontal bar. In this embodiment, each column 10 is a rectangular pipe that comprises four side walls to form an internal cavity 12. Two opposite side walls of each column 10 are provided with two rows of insertion holes 11 passing through the side walls of the columns 10 to form a channel with the internal cavity 12. The two rows of insertion holes 11 are arranged side by side along the extending direction of the column 10. Each row has a plurality of insertion holes 11 and the distance between them is equal. These insertion holes 11 make it possible to arrange the laminates or the like at different heights through the carrier arm 40. Each of the insertion holes 11 is a groove which has a smaller width in the transverse direction about 4 to 5 mm, which is difficult for the adults to insert one finger. Each of the insertion holes 11 has a height of about 20 mm and has the same spacing distance, such as 30, 40, and 50 mm. It is understandable that these designs can vary based on actual requirements.

[0021] The power supply strip support frame 20 is made of insulating material and is composed of two mountain-shaped structures arranged opposite each other. Each "mountain-shaped" structure comprises a power supply strip setting plate 21. The power supply strip support frame 20 is fixed in the internal cavity 12 of the column 10. In a cross section perpendicular to the extending direction of the column 10, the length of the power supply strip setting plate 21 is equal to the length of the internal cavity 12.

[0022] The power supply strip 30 serves for providing a low voltage, particularly a direct current. The power supply strip 30 comprises a first conducting strip 31 providing a first polarity current and a second conducting strip 32 providing a second polarity current. The first and second conducting strips 31, 32 are common circuits for providing different polarity voltages and are disposed on the power supply strip setting plate 21. The first and second conducting strips 31, 32 are disposed in parallel and spaced apart from each other. It is conceivable that each of power supply strip support frames 20 may have four of the supply strips 30 respectively disposed at two sides of the power supply strip setting plate 21. When the first and second conducting strips 31, 32 are embedded in the insulated power supply strip setting plate 21, they are insulated by an insulating material and covered with concave and convex ears made of an insulating material to provide additional non-electric contact protection. In the

shelf electrical supply system 100, the orientation of the column 10 doesn't need to be considered. Because the front and back sides of the column 10 are the same, and the carrier arm 40 are mounted on the front or rear side wall of the column 10. At the same time, power plug-ins for providing the interface for the lighting device or other power device is respectively provided by the first and second conducting strips 31, 32.

[0023] The carrier arm 40 may be made of steel plate, preferably which is made as a stamped part only by stamping and bending. The carrier arm 40 comprises a supporting portion 41 and an engagement portion 42 for engaging with the insertion hole 11. The supporting part 41 is used for placing laminates, which extends from the edge. The supporting portion 41 is vertically inserted into the insertion hole 11 of the column 10 and is supported on the front or rear side wall of the column 10 by the engaging portion 42. The engaging portion 42 comprises two portions, namely, a first engaging portion 421 and a second engaging portion 422 spaced from the first engaging portion 421. The first engaging portion 421 has a downwardly protruding nose-shaped hook that resembles a finger and is formed on an edge of the carrier arm 40 with a small cutout 423 formed below the nose-shaped hook. The second engaging portion 422 may also have a hook-shaped structure in principle, but in the present embodiment, it is a straight-edge extending portion for convenience of installation. The distance between the straight-edge extending portion and the nose-shaped hook is set as the minimum distance between the two insertion holes 12. When the carrier arm 40 is assembled to the column 10, the first and second engaging portions 421 and 422 are inserted into the insertion hole 11, and the side wall of the column 10 is inserted into the small cutout 423. While the second engaging portion 422 is inserted into the other insertion hole 11, the connecting portion between the first and second engaging portions 421 and 422 abuts the side wall of the column 10, so that the carrier arm 40 is hooked and hung on the column 10. The carrier arm 40 further comprises an opening 43 for disposing the shelf electrical supply 50. The opening 43 is disposed on the first engaging portion 421 or the second engaging portion 422 of the carrier arm 40 by a pressing process. When the engaging portion 42 is inserted into the insertion hole 12, the entire engaging portion 42 or only the first engaging portion 421 or only the second engaging portion 422 is inserted between the power supply strip setting plate 21 and the abutting plate 22. Thereby the shelf electrical supply 50 is electrically connected with the power supply strip 30.

[0024] The shelf electrical supply 50 is disposed in the opening 43 of the carrier arm 40 and comprises a bottom cover 51, a top cover 52 disposed on the bottom cover 51, positive and negative wires 53, 54 sandwiched between the bottom cover 51 and the top cover 52, and positive and negative power contactors 55, 56 sandwiched between the bottom cover 51 and the top cover 52, a circuit board 57 provided on the bottom cover 51,

a power plug-in assembly 58 disposed on the circuit board 57, and an end cover 59 mounted on the circuit board 57. It should be understood that the shelf electrical supply 50 may further comprise other functional components, such as a fastener for fixing the bottom cover 51 and the top cover 52, a mechanism for fixing the circuit board 57 and the like.

[0025] The bottom cover 51 comprises a body 511, protruding (512, 513 of the positive and negative contactors alternately disposed at ends of the body 511, a wire accommodating groove 514 arranged on the body 511, a circuit board accommodating end 515 located at the other end of the body 511. The bottom cover 51 is made of an insulating material, such as plastic, plastic or the like, by injection molding. The body 511 needs to extend into the power supply strip support frame 20 along with the carrier arm 40, and thus the body 511 may be in a strip shape. Protruding holes 512, 513 of the positive and negative contactors alternately are disposed at ends of the body 511 and insulated from each other. The protruding holes 512, 513 of the positive and negative contactors are spaced apart and arranged side by side in the inserting direction of the shelf electrical supply 50. The wire accommodating groove 514 is configured to hold the positive and negative wires 53, 54. Since the positive and negative power contactors 55, 56 are electrically connected to the positive and negative wires 53, 54 respectively, when the positive and negative wires 53, 54 are held in the bottom cover 51, the positive and negative power contactors 55, 56 are closer to the protruding holes 512, 513 of the positive and negative contactors so as to facilitate extending the positive and negative power contactors 55, 56 from the protruding holes 512, 513 of the positive and negative contactors. The circuit board accommodating end 515 is configured to set the circuit board 57 and hold the power plug-in assembly 58 and set the end cover 59. Therefore, the size of the circuit board accommodating end 515 is generally larger. Therefore, when assembled, the circuit board accommodating end 515 is generally disposed outside the column 10.

[0026] The top cover 52 comprises a groove 521 for holding the positive and negative sleeves 55, 56 and two magnet accommodating cavities 522 disposed in the groove 521. Since power take-plug assembly 58 is directly and fixed on the circuit board 57, the length of the top cover 52 extends from the end of the contactor accommodating end of the bottom cover 51 to the circuit board 57, but it can't cover the circuit board 57. In order to dispose the top cover 52 on the bottom cover 51, fasteners can be used such as screws, etc. To further reduce the size, a plurality of pins are disposed on the top cover 52, the bottom cover 51 is provided with a plurality of insertion holes for inserting the pins so as to fix the relative positions of the top cover 52. The function and structure of the groove 521 and the magnet accommodating cavity 522 are described below in detail with the positive and negative power contactors 55, 56.

[0027] The positive and negative wires 53, 54 are flexible wires, such as enamelled wires, to reduce the resilience of the positive and negative power contactors 55, 56. One ends of the positive and negative wires 53, 54 are respectively electrically connected to the positive and negative power contactors 55, 56, and the other ends of the positive and negative wires 53, 54 are electrically connected to the circuit board 57 for electrically connecting with the power plug-in assembly 58.

[0028] The positive and negative power contactors 55, 56 respectively comprise a positive and a negative sleeve 551, 561, and two superposed positive and negative magnets 552, 562 respectively arranged in the positive and the negative sleeves 551, 561. The positive and the negative sleeves 551, 561 respectively comprise a positive and a negative protruding portions 553, 563, a positive and a negative clamping portions 554, 564 respectively electrically connected with the positive and negative wires 53, 54. The positive and a negative protruding portions 553, 563 can extend out of the protruding holes 512, 513 of the positive and negative contactors. The positive and negative clamping portions 554, 564 are located between the bottom cover 51 and the top cover 52. Therefore, the positive and the negative sleeves 551, 561 may be stepped structures or frustum-shaped structures. In this embodiment, the positive and the negative sleeves 551, 561 are frustum-shaped structures. The positive and negative magnets 552, 562 respectively include two and are superposed together. As we all know, each magnet has N, S pole. The two magnets 552, 562 in each of the sleeves 551, 566 have the same polarity disposed opposite each other to generate mutually exclusive magnetic forces. Therefore, the positive and a negative protruding portions 553, 563 respectively protrude the protruding holes 512, 513 of the positive and negative contactors under the repulsive force of the two positive and negative magnets 552, 562 held in the positive and negative sleeves 551, 561. In order to make the positive and negative sleeves 551, 561 have a maximum route between the bottom cover 51 and the top cover 52, the top cover 52 is provided with a groove 521 for holding the positive and negative sleeves 551, 561. In order to prevent one of the two magnets from falling off, the top cover 52 is also provided with two magnet accommodating cavities 522, the magnet accommodating cavities 522 is configured to hold one of the two positive and negative magnets 552, 562. When one of the two magnets 552, 562 in each of the sleeves 551, 561 is fixed in the magnet accommodating cavity 522, the other one is held by the positive and negative sleeves 55, 56 under the influence of a magnetic force to prevent one of the two magnets from falling off. Of course, if the maximum gap between the negative sleeve 551, 561 and the top cover 52 is smaller than the thickness of the one magnet, the magnet accommodating cavity 522 may not be provided. In the normal state, the positive and negative magnets 552 and 562 make the positive and a negative protruding portions 553, 563 respectively protrude the protruding holes 512,

513 of the positive and negative contactors. When the shelf electrical supply 50 is inserted into the power supply strip support frame 20, a positive force is applied to the positive and negative power contactors 55, 56 to avoid fake connection.

[0029] The circuit board 57 is used for electrically connecting the positive and negative wires 53, 54 and the power plug-in assembly 58, and is also used for fixing the positive and negative wires 53, 54 and the power plug-in assembly 58. The structure and circuit arrangement of the circuit board 57 are technologies known to those skilled in the art, and they are not described herein again. The circuit board 57 is disposed on the circuit board accommodating end 514 of the bottom cover 51. Preferably, the circuit board accommodating end 514 may be an accommodating cavity, and then the circuit board 57 is placed in the accommodating cavity, which makes it easy to assemble.

The power plug-in assembly 58 is a commonly used wire connecting assembly in the prior art and corresponds to a socket for connecting with electric devices, such as a lamp, to provide power to the electric devices.

[0030] The end cover 59 is used to protect the circuit board 57 and the power plug-in assembly 58. The end cover 59 is also used for clamping the circuit board accommodating end 514 of the bottom cover 51 on the carrier arm 40. It is envisioned that the end cover 59 may include an accommodating cavity 591 for holding the power plug-in assembly 58. The end cover 59 and the bottom cover 51 can be connected by any means, such as screwing, latching, or even gluing. In this embodiment, for ease of assembly, the barb assembly is adopted, that is, the end cover 59 has four barbs and the bottom cap 51 has four through holes. By utilizing the interference fit principle and the elasticity of the material itself, the end cover 59 and the bottom cover 51 are fastened together.

[0031] Compared with the prior art, the assembly of the carrier arm can be completed when the carrier arm of the shelf electrical supply system 100 is inserted into the insertion hole 11 of the column 10 so that the impact of the tolerance is minimized when assembling the column, the back board and the carrier arm 40.

[0032] In summary there is disclosed a shelf electrical supply and its shelf electrical supply system including a bottom cover, a top cover disposed on the bottom cover, positive and negative wires sandwiched between the bottom cover and the top cover and insulated from each other, and positive and negative power contactors sandwiched between the bottom cover and the top cover. The positive and negative power contacts respectively include a positive and a negative sleeve, and two superposed positive and negative magnets respectively arranged in the positive sleeve and the negative sleeve. The two magnets are mutually exclusive and respectively located between the positive and negative protruding portions and the top cover. The positive and negative extensions respectively protrude the protruding holes of the positive and negative contactors under the repulsive

force of the two positive and negative magnets. The assembly of the carrier arm can be completed when the carrier arm of the shelf electrical supply system is inserted into the insertion hole of the column so that the impact of the tolerance is minimized when assembling the column and the carrier arm.

[0033] The above disclosure has been described by way of example and in terms of exemplary embodiment, and it is to be understood that the disclosure is not limited thereto. Rather, any modifications, equivalent alternatives or improvement etc. within the spirit of the invention are encompassed within the scope of the invention as set forth in the appended claims.

Claims

1. A shelf electrical supply (50), comprising: a bottom cover (51), a top cover (52) disposed on the bottom cover, positive and negative wires (53, 54) sandwiched between the bottom cover and the top cover and insulated from each other, and positive and negative power contactors (55, 56) sandwiched between the bottom cover and the top cover,

the bottom cover (51) comprising a body (511), protruding holes (512, 513) of the positive and negative contactors alternately disposed at ends of the body, a wire accommodating groove (514) arranged on the body;

the positive and negative wires (53, 54) being held in the wire accommodating groove (514); the positive and negative power contactors (55, 56) respectively comprising a positive and a negative sleeves (551, 561), and two superposed positive and negative magnets (552, 562) respectively arranged in the positive and the negative sleeves;

the positive and the negative sleeves (551, 561) respectively comprising a positive and a negative protruding portion (553, 563), a positive and a negative clamping portion (554, 564) respectively electrically connected with the positive and negative wires; the positive and negative clamping portions being located between the bottom cover (51) and the top cover (52); two magnets (552, 562) held in the positive and the negative sleeves (551, 561) being mutually exclusive and being located between the positive and negative protruding portions (553, 563) and the top cover (52); the positive and negative protruding portions respectively protruding the protruding holes (512, 513) of the positive and negative contactors under the repulsive force of the two positive and negative magnets (552, 562) held in the positive and negative sleeves.

2. The shelf electrical supply (50) as claimed in claim

1, wherein the bottom cover further comprises a circuit board accommodating end located at the another end of the body, and the shelf electrical supply comprises a circuit board held in the accommodating end of the circuit board, the circuit board is electrically connected to the positive and negative wires.

3. The shelf electrical supply (50) as claimed in claim 2, wherein the shelf electrical supply further comprises a power plug-in assembly disposed on the circuit board, and an end cover mounted on the circuit board accommodating end.

4. The shelf electrical supply (50) as claimed in claim 3, wherein the end cover comprises an accommodating cavity, and the power plug-in assembly is disposed in the accommodating cavity.

5. The shelf electrical supply (50) as claimed in one of the preceding claims, wherein the positive and negative sleeves are a frustum-shaped sleeve.

6. The shelf electrical supply (50) as claimed in one of the preceding claims, wherein the positive and negative wires are flexible enameled wires.

7. The shelf electrical supply as claimed in one of the preceding claims, wherein the top cover comprises a groove for holding the positive and negative sleeves.

8. The shelf electrical supply as claimed in claim 7, wherein the top cover further comprises two magnet accommodating cavities disposed in the groove, each of the magnet accommodating cavities is configured to fix one of the two magnets respectively held in the positive and negative sleeves.

9. The shelf electrical supply as claimed in one of the preceding claims, wherein the positive and negative clamping portions are clamped between the top cover and the protruding holes of the positive and negative contactors of the bottom cover.

10. A shelf electrical supply system (100) comprises at least one carrier arm (40) disposed on a column (10), and at least one shelf electrical supply (50) as described in one claim of the claim 1 to the claim 7 disposed on the carrier arm (40); the carrier arm comprises an opening (43) for setting the shelf electrical supply.

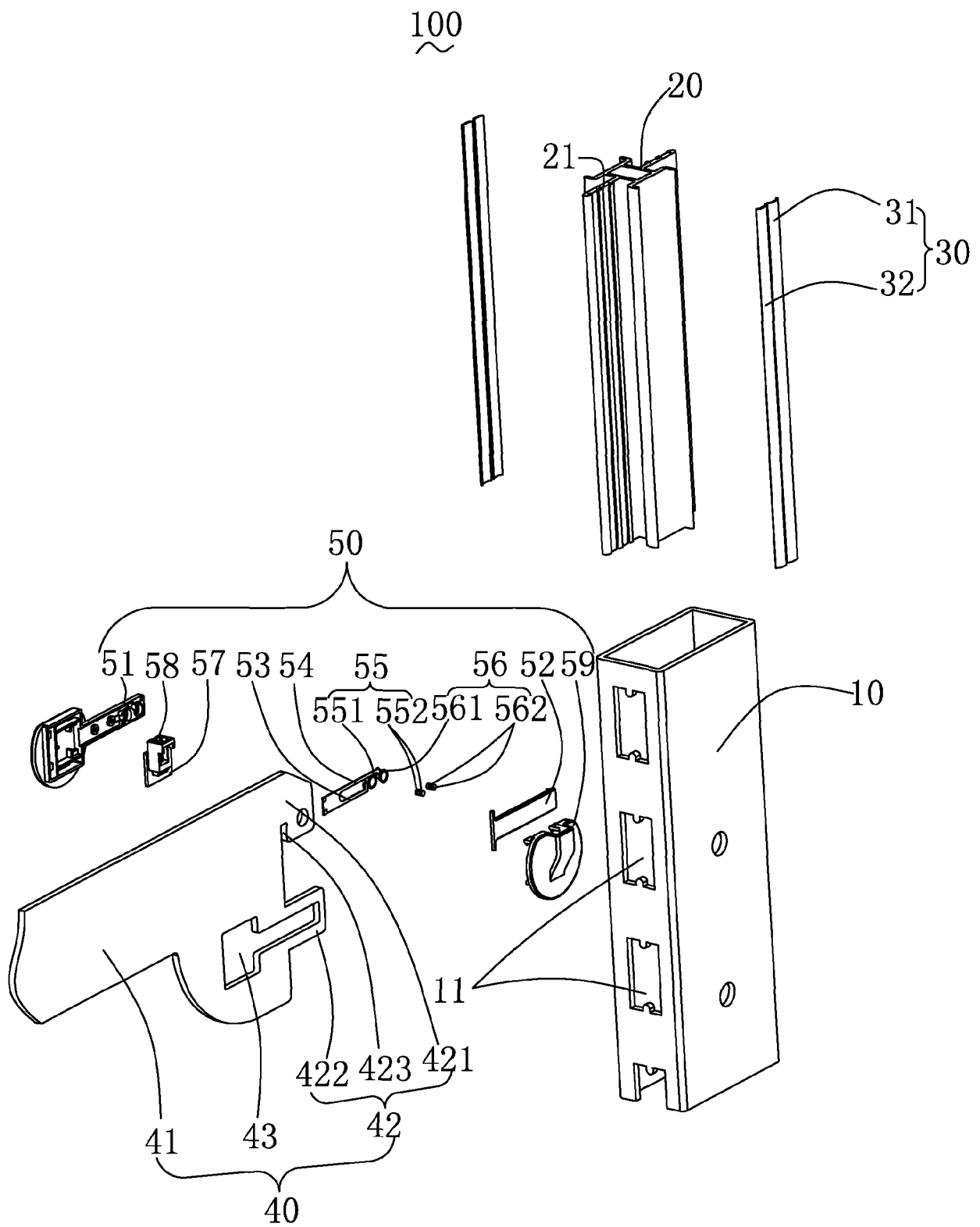


FIG. 1

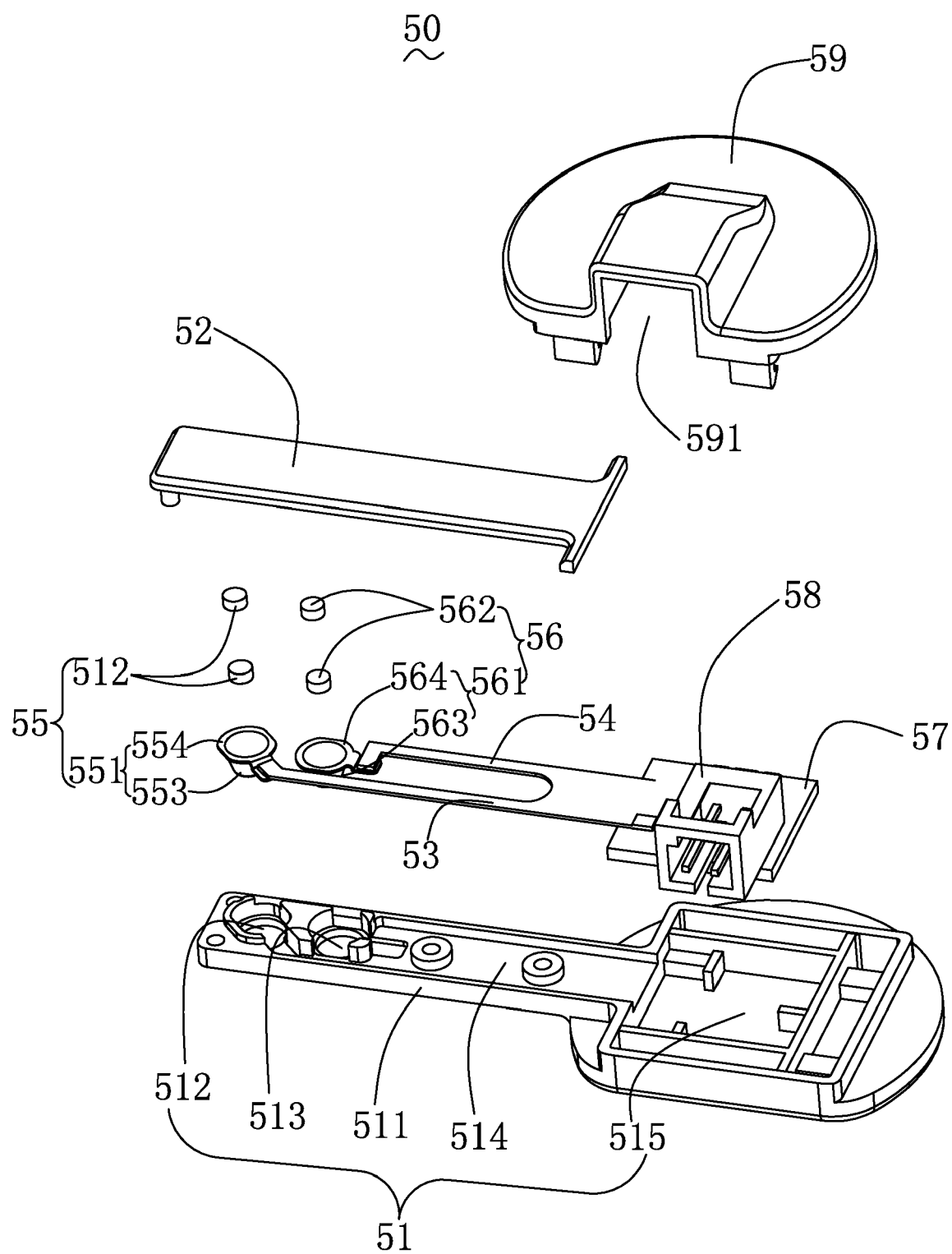


FIG. 2

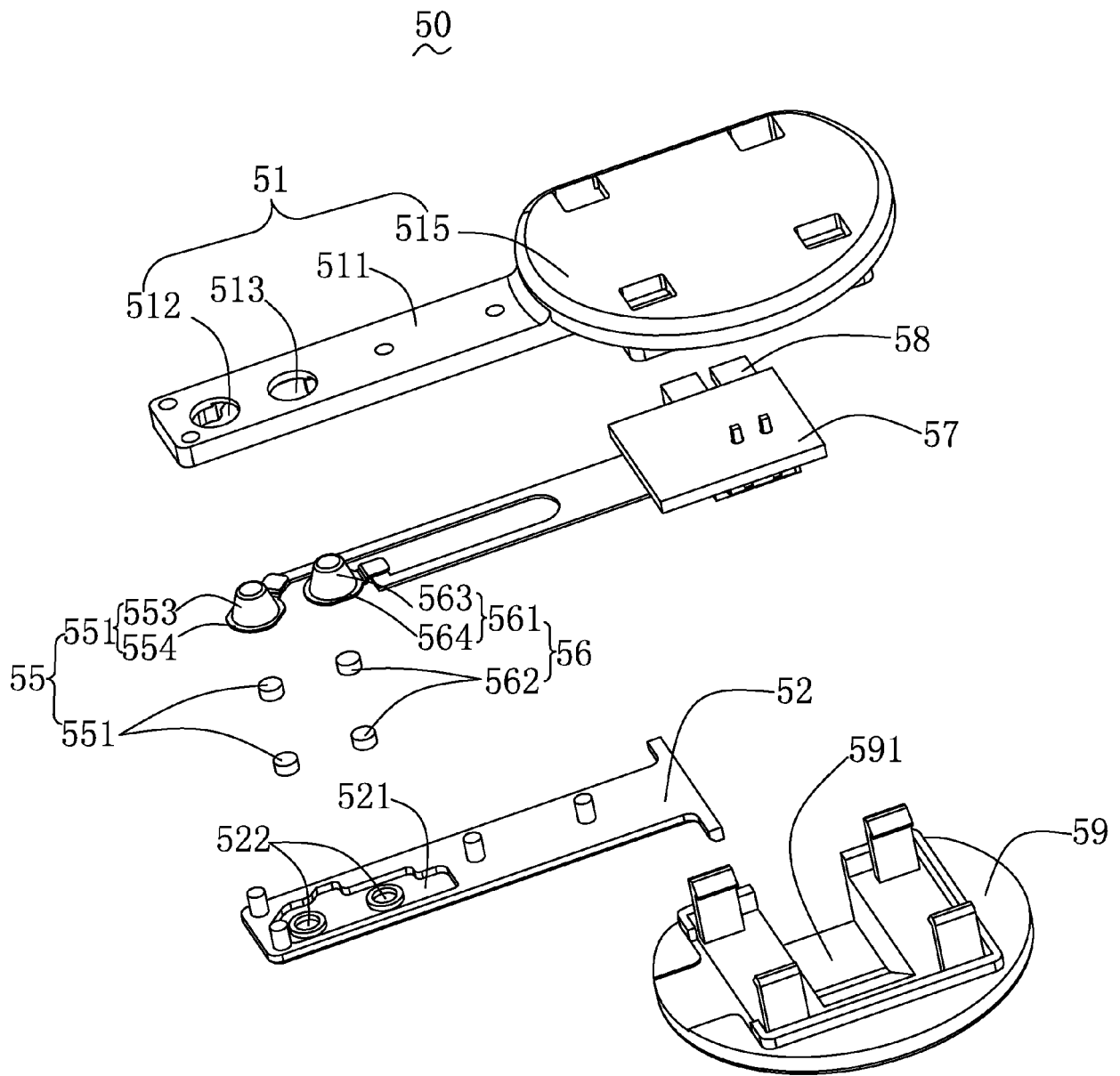


FIG. 3

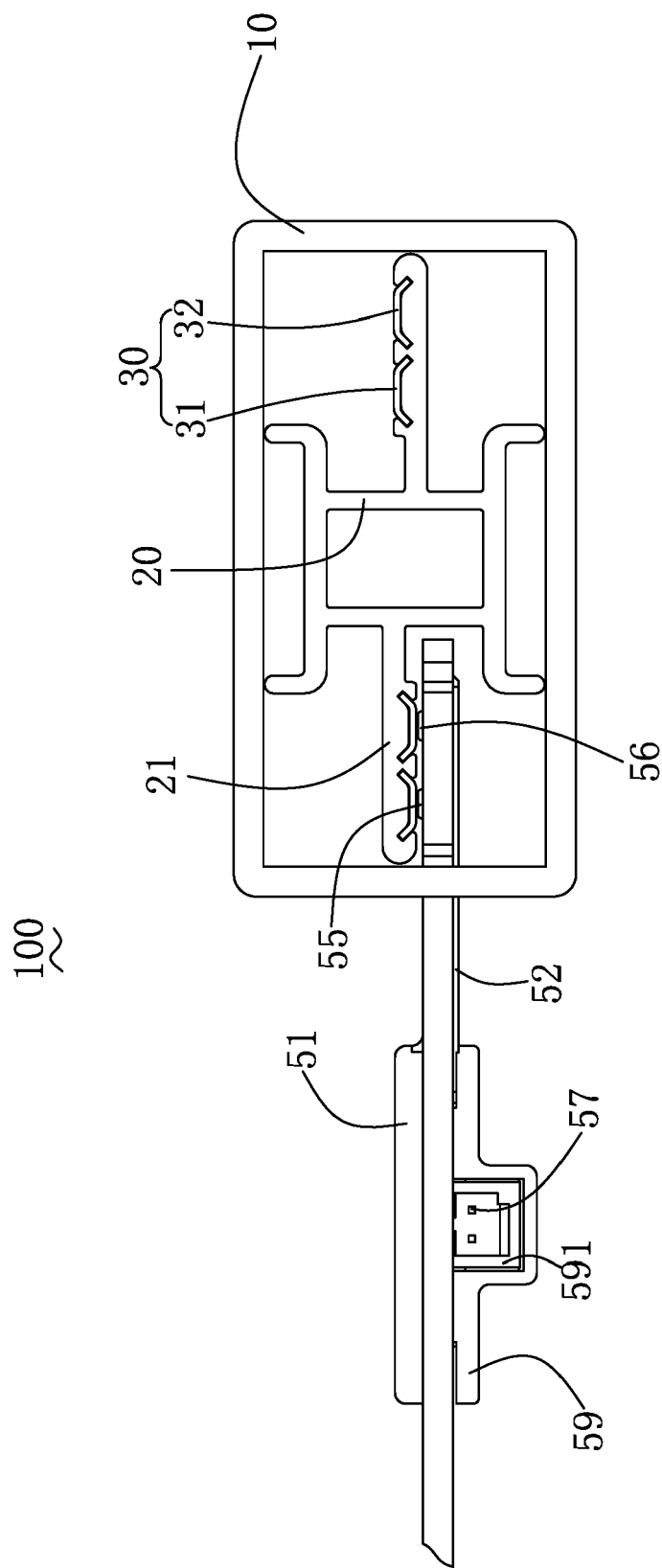


FIG. 4



EUROPEAN SEARCH REPORT

Application Number
EP 18 16 8156

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2008/113524 A1 (HA SEOUNG-SU [KR] ET AL) 15 May 2008 (2008-05-15) * paragraphs [0007] - [0009]; figures 2A-2B *	1	INV. A47B96/06 H01R11/30
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			TECHNICAL FIELDS SEARCHED (IPC)
			A47B A47F H01R F21V
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 27 June 2018	Examiner Martinez Valero, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 18 16 8156

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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27-06-2018

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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