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(54) Hinge device

(57) A hinge device between a door leaf (3) and a door frame (2) allows movement of the door leaf (3) between a closed position and an openable position in which the door leaf (3) is pivotable. The door leaf (3) engages in said closed position an engaging means (13) arranged in the door frame (2) at a distance from the hinge device. The hinge device has a lock mechanism (16) which in a locked position prevents movement of the door leaf (3) from said closed position to said openable position, and which in an unlocked position allows movement of the door leaf (3) from said closed position to said openable position.

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Description

Technical Field

[0001] The present invention relates to a hinge device between a door leaf and a door frame for moving the door leaf between a closed position and an openable position, in which the door leaf is pivotable.

Background Art

[0002] Hinges are currently used in various applications, of which hanging of doors is one of the commonest. Such a hinge consists of one part attached to the door and another part attached to a frame around the door. These two parts are then interconnected in such a manner that they are pivotable relative to each other and allow opening and closing of the door.

[0003] When storing and displaying expensive objects, cabinet constructions with glass panels are frequently used which allow a user to see the expensive object. For instance museums and jewellers place stringent requirements on the mounting of the glass panels, both in respect of the aesthetic appearance and in respect of security.

[0004] A technique that is currently used is the possibility of sliding the glass panel along vertical grooves on both sides of the frame construction. The functionality of such a solution is restricted by the height of the cabinet and the height of the panel which are decisive of the vertical openablility of the panel. Another construction comprises, just like the one above, two parallel grooves of the cabinet frame, but arranged horizontally instead of vertically. However, such a solution does not allow two cabinets to be placed close to each other, since a neighbouring cabinet prevents the panel from being slid in the lateral direction.

[0005] Other techniques that are currently used involve exteriorly mounted or recessed hinges. These types of hinges result in part of the hinges being visible from the outside of the cabinet. Since in many cases it is required that the panel be locked on two opposite sides, the constructions according to prior art technique necessitate further devices which in a burglar-proof manner lock the glass panel to the frame of the cabinet.

[0006] DE-A-10107471 and US-A-6687956 disclose examples of pivotable fastening devices to be used in opening and closing of display case doors.

Summary of the Invention

[0007] An object of the present invention is to provide an improvement of the above-described prior art technique.

[0008] A special object of the present invention is to provide a hinge device which is improved relative to prior art technique.

[0009] According to the present invention, these objects are achieved by a hinge device between a door leaf and a door frame for moving the door leaf between a closed position and an openable position in which the door leaf is pivotable, the door leaf in said closed position engaging an engaging means arranged in the door frame at a distance from the hinge device. The hinge device comprises a lock mechanism which in a locked position prevents movement of the door leaf from said closed position to said openable position and which in an unlocked position allows movement of the door leaf from said closed position to said openable position.

[0010] This is advantageous since a safe locking of the door leaf is provided in a discreet, hidden and effective manner.

[0011] In the openable position, the door leaf may be arranged outside the door frame, which results in the advantage that the door leaf can swing freely.

[0012] The hinge device may comprise a link system arranged to provide, in movement of the door leaf between the closed position and the openable position, a linear motion and a rotary motion of the door leaf. The hinge device may comprise a first part connected to the door leaf, a second part connected to the door frame and an intermediate part, the first part, the second part and the intermediate part being pivotally connected to each other. This is favourable by allowing the hinge device to move in a more complex pattern, that is in several directions in addition to inward.

[0013] Preferably, the first part, the second part and the intermediate part are pivotally connected to each other by pins which may extend along the entire length of the door leaf, which gives the advantage that the weight of the door is distributed on the pins.

[0014] The lock mechanism may comprise a latch pin and a latch bolt which are interconnected by an intermediate latch portion, thereby achieving a functional locking device since a plurality of latch bolts can be connected to one latch pin.

[0015] The latch pin may extend along the entire height of the door leaf, which is advantageous by the latch pin carrying part of the weight of the door.

[0016] The latch bolt may in the locked position mechanically block the hinge device from moving the door leaf to the openable position, which results in a simple and reliable construction.

[0017] The movement of the lock mechanism to and from the locked position may be linear, thereby achieving a safe and distinct motion.

[0018] According to the invention, also a cabinet construction is provided, comprising at least one hinge device of the type described above.

Brief Description of the Drawings

[0019] Further objects and advantages and also features of the invention - and some embodiments thereof - will be evident from the following description of a number of implementations which is given with reference to the

accompanying schematic drawings.

Fig. 1 is a cross-section of a hinge device in a closed position in one embodiment of the present invention.
Fig. 2 is a cross-section of a hinge device in Fig. 1 in an openable position.
Fig. 3 shows a first part of the hinge device in Fig. 1.
Fig. 4 shows a second part of the hinge device in Fig. 1.
Fig. 5 shows a third part of the hinge device in Fig. 1.
Fig. 6 shows a fourth part of the hinge device in Fig. 1.
Fig. 7 is a perspective view of the hinge device in Fig. 1 when the lock mechansim is in a locked position.
Fig. 8 is a perspective view of the hinge device in Fig. 1 when the lock mechansim is in an unlocked position.
Fig. 9 is a perspective view of the hinge device in Fig. 1 from a different angle.
Fig. 10 is a perspective view of a cabinet having hinge devices according to an embodiment of the present invention.

Description of Embodiments

[0020] Fig. 1 is a cross-section of a hinge device 1 along the line I-I in Fig. 10. The hinge device 1 is attached to a door frame section 2 and a schematically illustrated door leaf 3 and has four parts 4, 5, 6, 7 which are pivotally connected to each other by three pins 8, 9, 10. A lock mechanism 16 (see Figs 7-9) is adapted to act along two pins 11, 12. The parts 4-7 are each shown separately in Figs 3-6.

[0021] The door frame section 2 is attached to a cabinet 20 (see Fig. 10) and is adapted to hold the part 4, which is formed with a dovetail 14 which engages the door frame section 2, but other fitting designs may be equally convenient. Moreover the part 4 is, via the parts 5, 6, pivotally connected to the part 7. In this way, the hinge device 1 comprises three pivot pins 8, 9, 10. The part 7 is attached to the door leaf 3 by means of a recess 15 which surrounds an edge portion 3a of the door leaf 3. An opposite edge portion 3b of the door leaf 3 is surrounded by and in locking engagement with an engaging means 13 of the door frame. The engaging means 13 has the form of a sectional element of the cabinet 20 (see Fig. 10).

[0022] The hinge device 1 moves the door leaf 3 from a closed position which is shown in Fig. 1 to an openable position which is shown in Fig. 2. In such a movement, the part 7 is first moved outward so that the door leaf 3 is put at an angle to the engaging section 13. A narrow gap between the door leaf 3 and the engaging section 13 allows such movement of the door leaf 3.

[0023] When the door frame section 2 no longer blocks the door leaf 3 from moving in the lateral direction, the parts 5, 6, 7 will pivot on the pins 8, 9, 10 so that the door leaf 3 is disengaged from the engaging section 13. In this position the door leaf 3 is openable and can swing freely up to at least 160° in the direction A which is shown in Fig. 2. Correspondingly, a movement of the door leaf 3 occurs from the openable position to a closed position by the door leaf 3 being first allowed to engage the engaging section 13 so that the door leaf 3 is put at an angle to the door frame section 2. Subsequently the door leaf 3 is pressed toward the door frame section 2 so that the parts 5, 6, 7 pivot on the pins 8, 9, 10 until the door leaf 3 is in its closed position.

[0024] Fig. 7 illustrates the link and lock system of the hinge device 1 in more detail. A lock mechanism 16 comprises a latch pin 17, a latch bolt 18 and an intermediate latch portion 19. The latch pin 17 extends along the pin 11 through the part 4, and the latch bolt 18 extends along the pin 12 through the part 4. The pin 8 extends freely through the latch portion 19 without engaging the same. The lock mechanism 16 can be moved along the pin 8. The latch pin 17 extends along the entire height of the door leaf 3, whereas the latch bolt 18 has a limited extent. In the embodiment described, the latch bolt 18 is shorter than the total thickness of the hinge device 1.

[0025] With the lock mechanism 16 in its locked position (shown in Fig. 7) the latch bolt 18 blocks the part 5 from pivoting and thereby allowing movement of the door leaf 3 to the openable position. With the lock mechanism 16 in its unlocked position (shown in Fig. 8), the latch pin 17, the latch bolt 18 and the latch portion 19 have been moved upward (arrow B in Fig. 7), and thus the latch bolt 18 no longer blocks the part 5 from pivoting and thereby allowing movement of the door leaf 3 to the openable position. The lock mechanism 16 can also be arranged in other manners, such as below the hinge device 1. In that case, the hinge device 1 is unlocked by the lock mechanism 16 being moved downward.

[0026] The parts 4-7 have a certain extent in the vertical direction. They also have grooved sections which are different for the respective parts so that they are connected to each other in an advantageous way. The parts 4, 6 are designed to be able to grasp the parts 5, 7 on both sides.

[0027] Fig. 9 is a different perspective view of the hinge device 1 in Fig. 7 and shows especially how the part 7 of the hinge device 1 extends along the length of the door leaf 3 (not shown). The part 7 is pivotally connected to the part 6 by the pin 10.

[0028] Fig. 10 illustrates an example of a cabinet 20 which is provided with three hinge devices 1 for moving and locking a door panel 3. It is also possible to mount the hinge devices 1 in other manners, such as by arranging a different number of hinge devices 1 along other frame portions. In that case, the hinge devices 1 may be mounted along the upper and lower frame of the cabinet 20. In such a construction, for instance gas springs can be used to carry the weight of the door leaf 3 in an openable position (not shown).

[0029] Finally it should be emphasised that the invention is not limited to the embodiments described above,

and many modifications are conceivable within the scope of the inventive idea as defined in the appended claims. The invention is applicable to various cabinet constructions, for instance display cases, glass show cases and safety cabinets where the door leaf is a pivotally mounted glass panel. In certain applications the door leaf may consist of a door which is pivotally mounted and lockable by a hinge device according to the invention.

Claims

1. A hinge device between a door leaf (3) and a door frame (2) for moving the door leaf (3) between a closed position and an openable position in which the door leaf (3) is pivotable, the door leaf (3) in said closed position engaging an engaging means (13) arranged in the door frame (2) at a distance from the hinge device, and the hinge device comprising a lock mechanism (16), which comprises a latch bolt (18) which in a locked position mechanically blocks the hinge device and prevents movement of the door leaf (3) from said closed position to said openable position, and which in an unlocked position allows movement of the door leaf (3) from said closed position to said openable position.

2. A hinge device as claimed in claim 1, wherein the door leaf (3) in said openable position is arranged outside the door frame (2).

3. A hinge device as claimed in claim 1 or 2, further comprising a link system (4-7) arranged to provide, in movement of the door leaf (3) between the closed position and the openable position, a linear motion and a rotary motion of the door leaf (3).

4. A hinge device as claimed in claim 3, wherein the link system comprises a first part (7) connected to the door leaf (3), a second part (4) connected to the frame (2) and an intermediate part (5, 6), the first part (7), the second part (4) and the intermediate part (5, 6) being pivotally connected to each other.

5. A hinge device as claimed in claim 4, wherein the first part (7), the second part (4) and the intermediate part (5, 6) are pivotally connected to each other by pins (8, 9, 10) which extend along the entire length of the door leaf (3).

6. A hinge device as claimed in any one of claims 1-5, wherein the lock mechanism (16) comprises a latch pin (17) and a latch bolt (18) which are interconnected by an intermediate latch portion (19).

7. A hinge device as claimed in claim 6, wherein the latch pin (17) extends along the entire height of the door leaf (3).

8. A hinge device as claimed in any one of claims 1-7, wherein the movement of the lock mechanism (16) to the locked position and from the same is linear.

9. A cabinet construction with an openable door, comprising at least one hinge device as claimed in any one of the preceding claims.

Fig. 1

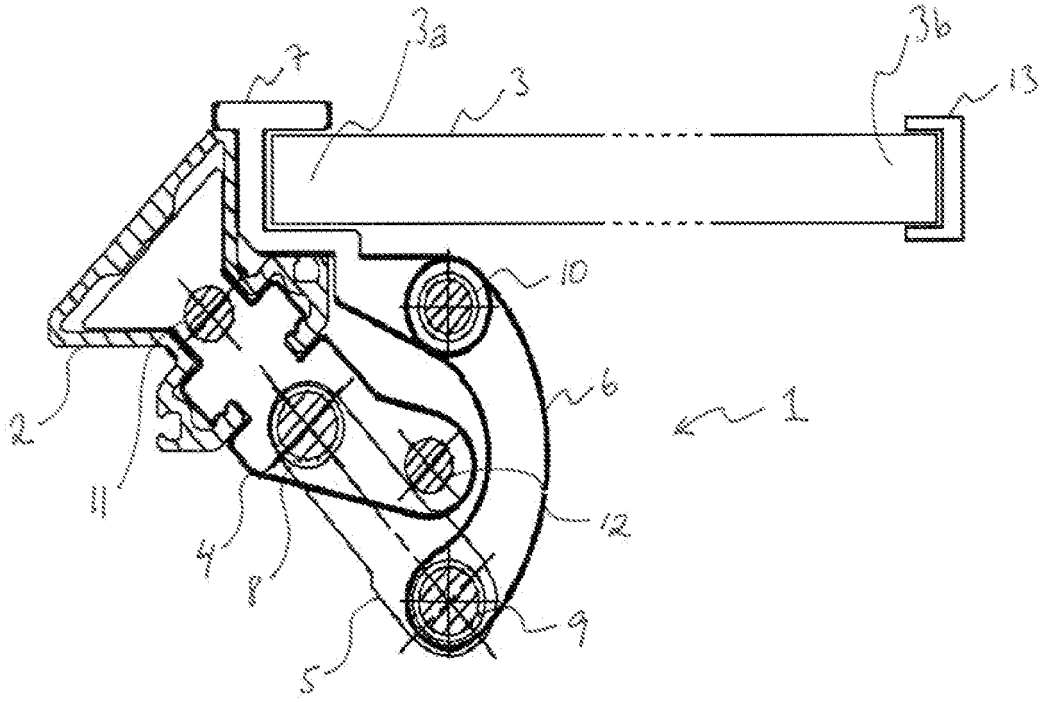


Fig. 2

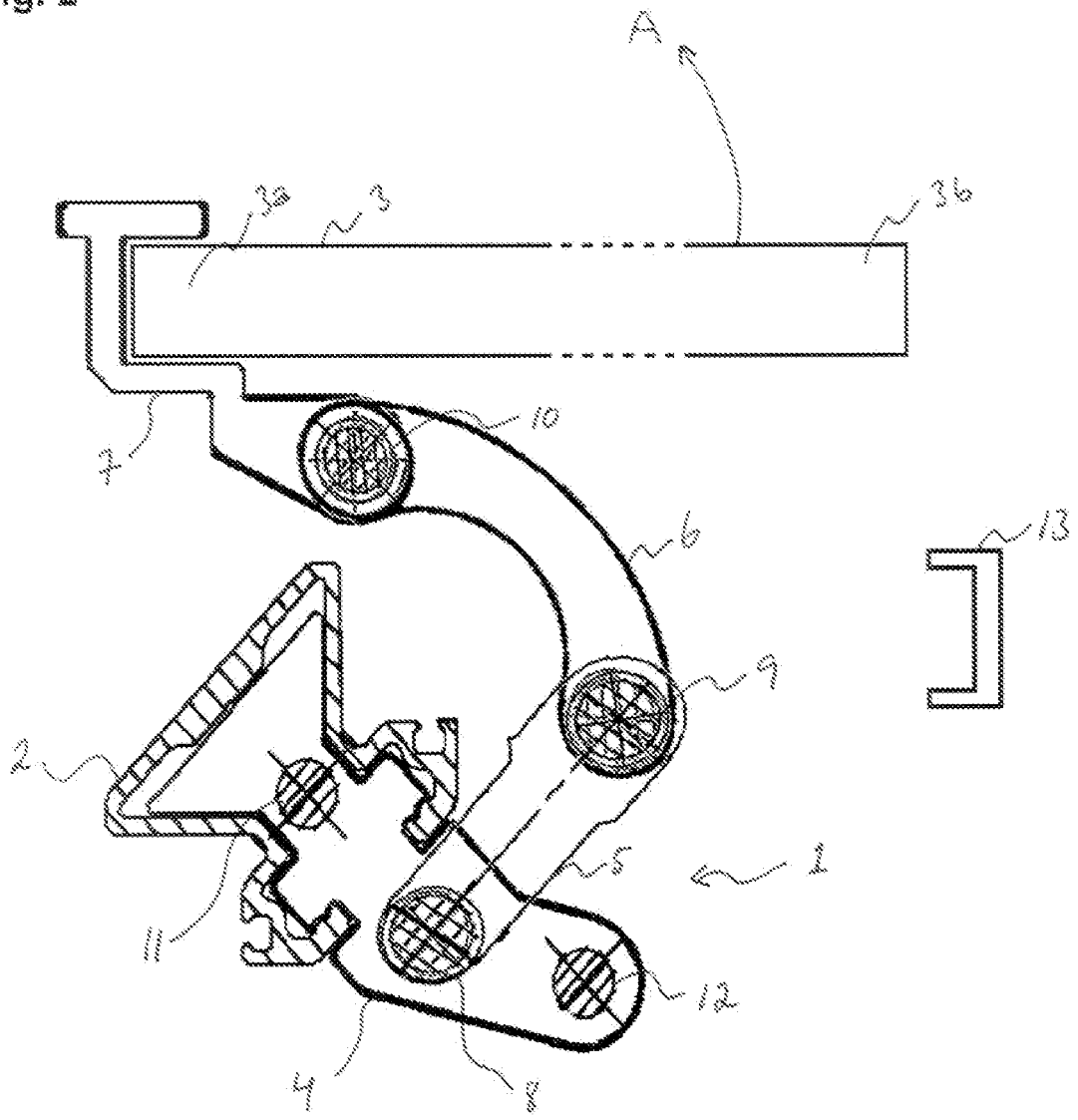


Fig. 3

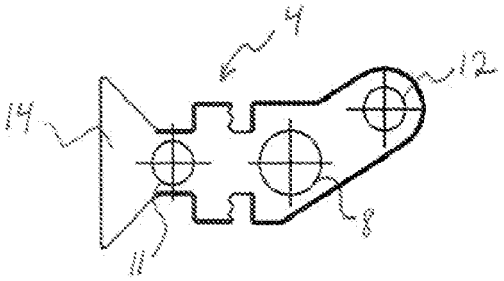


Fig. 4

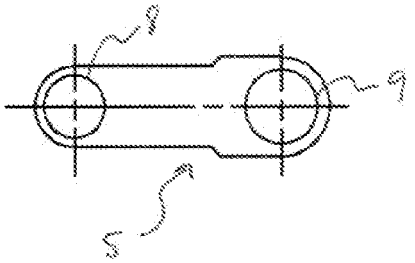


Fig. 5

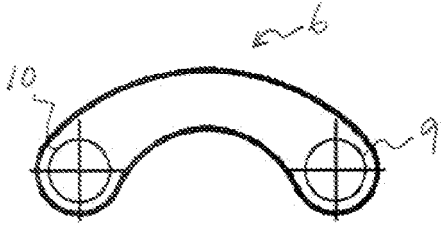


Fig. 6

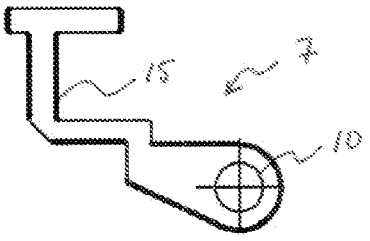


Fig. 7

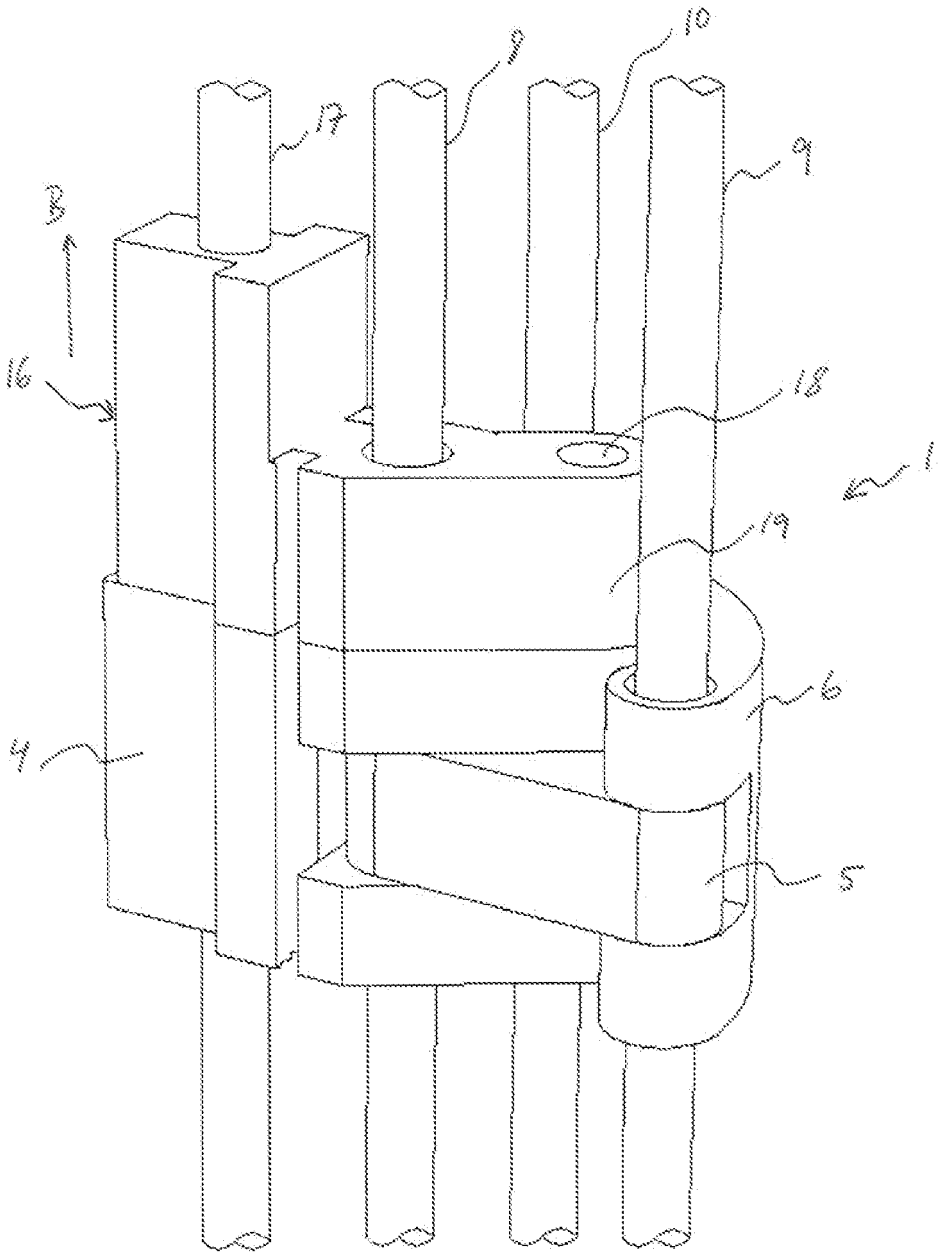


Fig. 8

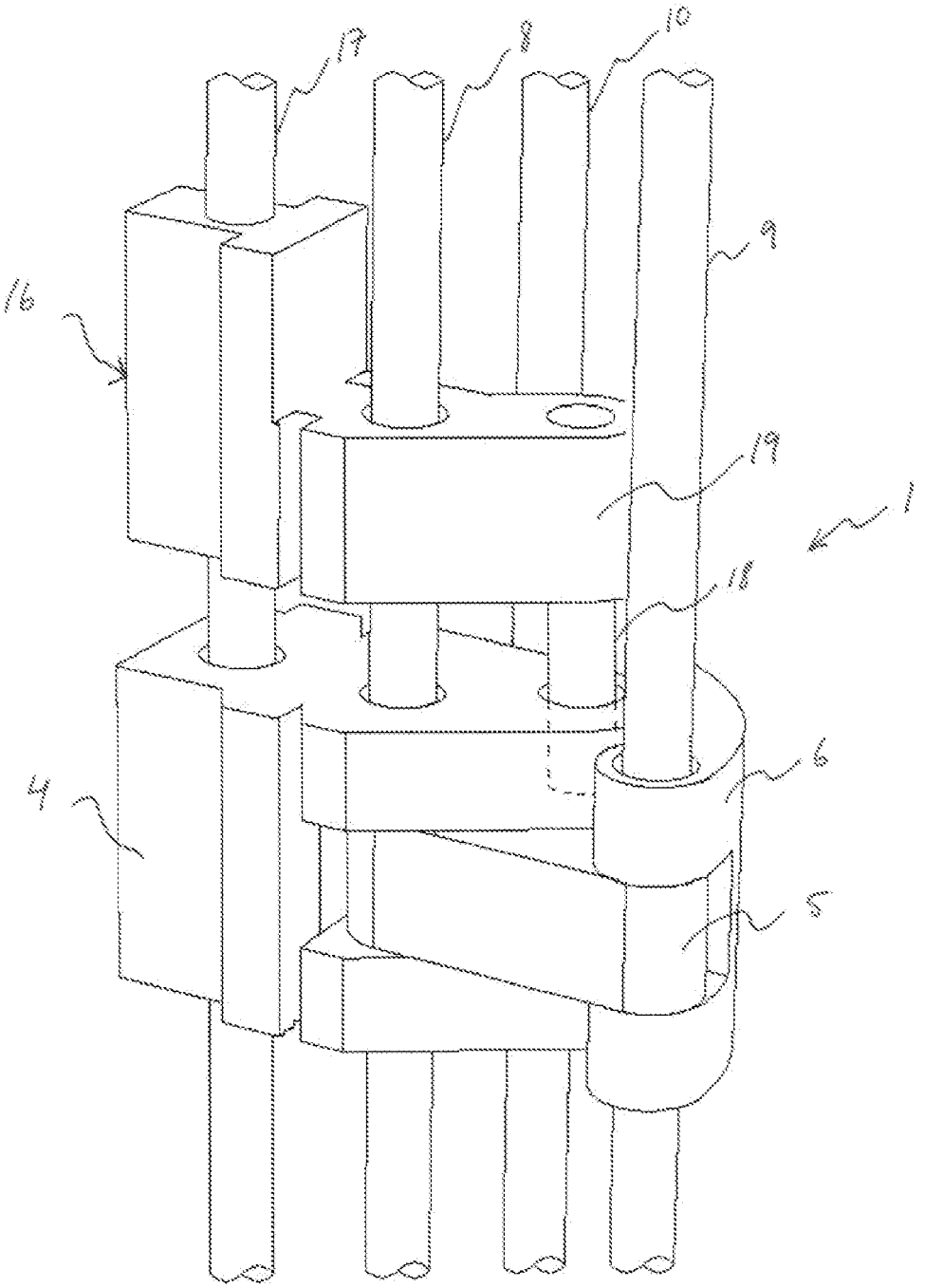


Fig. 9

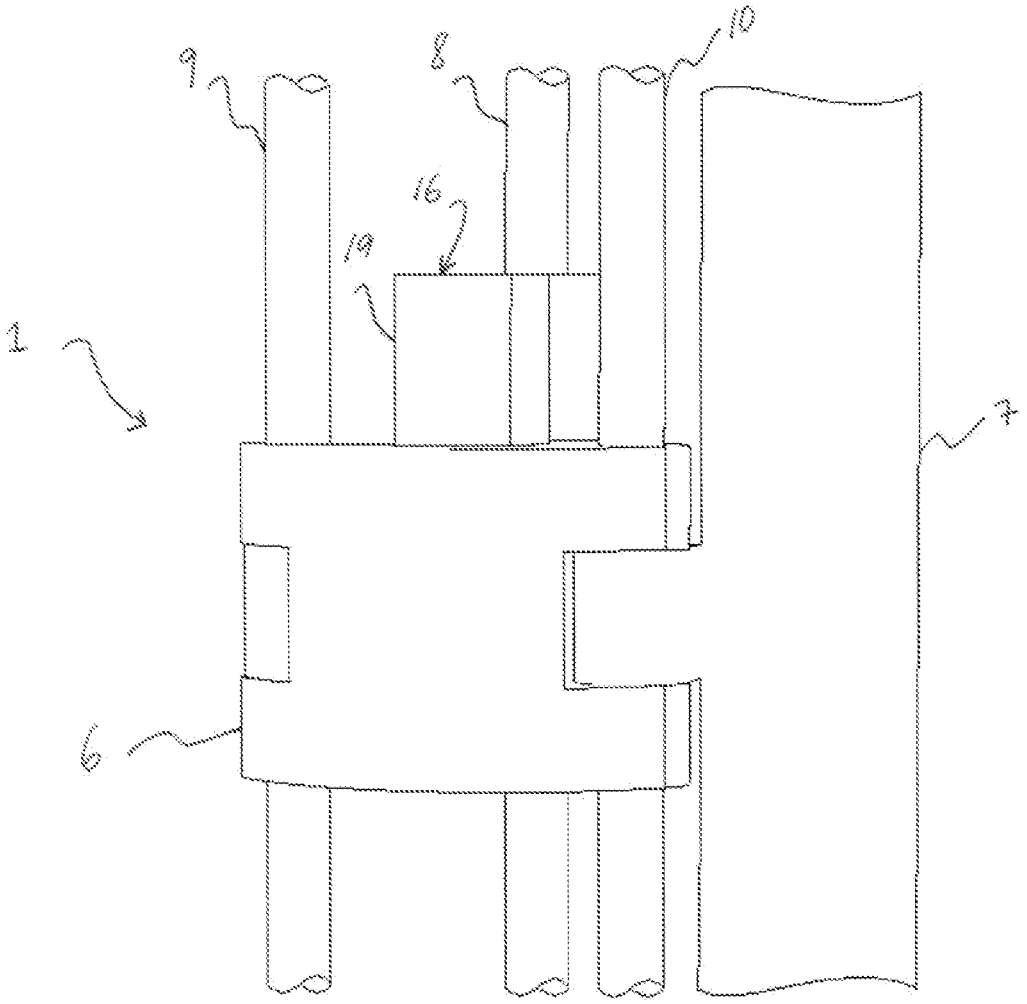
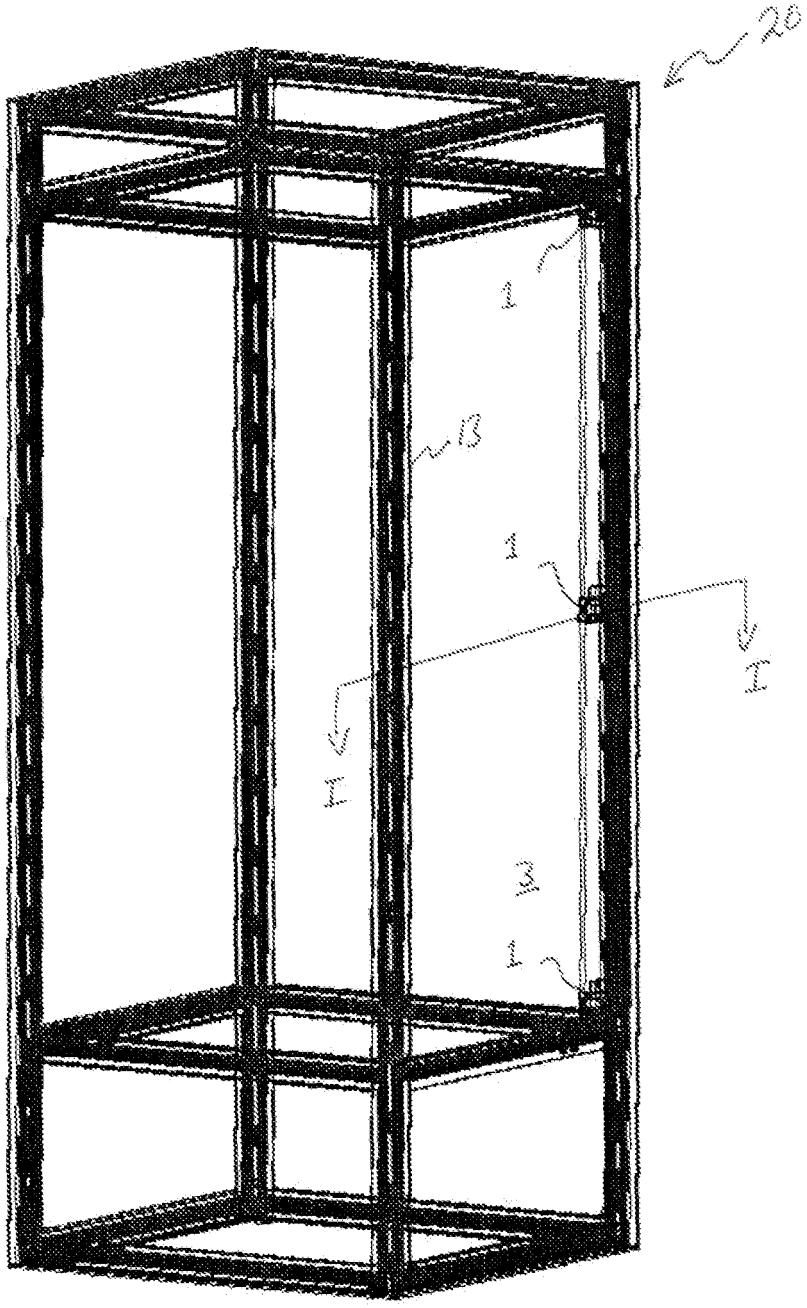


Fig. 10



REFERENCES CITED IN THE DESCRIPTION

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