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(54) **A height-adjustable carrier element**

(57) Home appliance (a) of the invention comprises at least one carrier element (1) having at least one movement element (2) provided on at least one side surface; at least one movement slot (B) in which movement element (2) moves and which is located on least at one side surface (D) of at least one internal compartment (C); and the movement slot (B) comprises at least one first-type guide (3) to at least one side of which at least one first-type arm (7) is connected under which the movement element (2) passes when there is no load on the arm (7) in its normal position and over which the movement element (2) passes by rotation of the arm (7) at the joint axis when there is load on the arm (7); comprises at least one

second-type guide (4) to at least one side of which at least one second-type arm (10) is connected over which the movement element (2) passes when there is no load on the arm (10) in its normal position and under which the movement element (2) passes by rotation of the at the joint axis with the force exerted by the movement element (2) while the movement element (2) is passing under the arm (10), and which turns back to its normal after the movement element (2) is passed; and comprises at least one third-type guide (5) to at least one side of which at least one first-type arm (8) is connected and to at least one side of which at least one second-type arm (9) is connected.

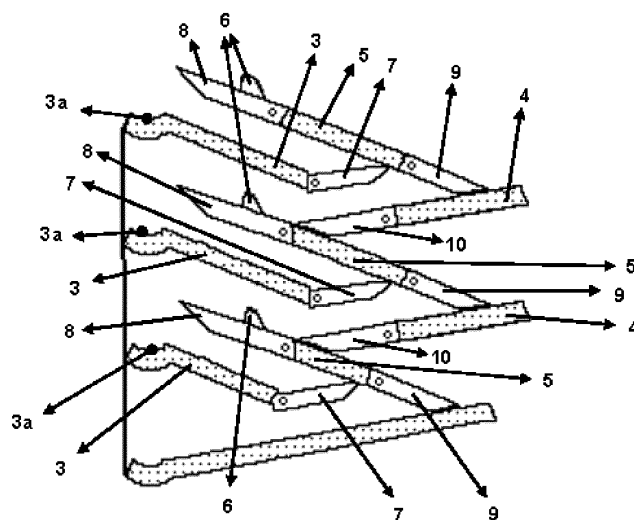


Figure - 3

Description

Technical Field

[0001] This invention relates to adjusting the height of carrier elements used in home appliances.

Prior Art

[0002] Carrier elements are provided in some home appliances for placing goods. These carrier elements can be in the form of shelf. These carrier elements are needed to be moved in accordance with the dimensions of the goods to be placed thereon. For instance, when a good which is higher than a distance between two shelves is wanted to be placed in a shelf, the necessary space is obtained by changing the position of at least one of the shelves. In the methods of the state of art for changing the position of a carrier element by moving the carrier element, firstly the carrier element is needed to be removed from the slot it is provided and then engaged to another slot. However, the goods on the carrier element are needed to be removed for performing this action. These actions lead to loss of power and time.

[0003] A patent document No DE3544446C1 of the state of art discloses a refrigerator comprising a movable shelf. In the system, wheels are provided at side parts of the shelf. These wheels move on the slots provided on the refrigerator. As a result of the movement of the wheels in the slots, the height of the shelf is able to be changed. However in the system, when the shelf is wanted to be lowered, the contact of the wheels with the slot is interrupted. In such a case, goods on the shelf can fall or collapse since the shelf makes almost a free fall for a while.

[0004] In another patent document No WO03095912A1 of the state of art, a home appliance comprising a movable shelf is disclosed. Wheels are placed at the edges of said shelf. The height of the shelf is able to be adjusted as a result of the movement of the wheels in a slot form comprising horizontal and cross slots in home appliance. However, in the shelf system mentioned in the document, no router is provided at the junction points of the channels, and the user is needed to direct a shelf a little upwards or downwards manually for moving the shelf upwards or downwards.

Brief Description of the Invention

[0005] Home appliance of the invention comprises at least one carrier element having at least one movement element provided on at least one side surface of the carrier element; at least one movement slot in which movement element moves and which is located at least one side surface of at least one internal compartment of the home appliance; and the movement slot comprises at least one first-type guide to at least one side of which at least one first-type arm is connected under which the

movement element passes when there is no load on the arm in its normal position and over which the movement element passes by rotation of the arm at the joint axis when there is load on said arm; comprises at least one second-type guide to at least one side of which at least one second-type arm is connected over which the movement element passes when there is no load on the arm in its normal position and under which the movement element passes by rotation of the arm at the joint axis with the force exerted by the movement element while the movement element is passing under the arm, and which turns back to its normal position after the movement element is passed; and comprises at least one third-type guide to at least one side of which at least one first-type arm is connected and to at least one side of which at least one second-type arm is connected.

[0006] When a user wants to change the height of the movement element, he/she raises it at desired height by moving the carrier element back and forth. The user is able to do the process by not moving the goods thereon. The movement of the carrier element is ensured without the fall and collapse of the goods thereon.

Objective of the Invention

[0007] The aim of the invention is to develop a home appliance comprising a height-adjustable carrier element.

[0008] The other aim of the invention is to develop a home appliance comprising a carrier element the height of which is easily and safely changeable.

[0009] The other aim of the invention is to develop a home appliance comprising a height-adjustable carrier element which is easily controllable.

[0010] Another aim of the invention is to develop a home appliance comprising a carrier element the height of which is adjustable while goods are thereon.

[0011] A further aim of the invention is to develop a home appliance comprising a height-adjustable carrier element without the danger of falling and/or collapsing of the goods thereon.

[0012] Yet a further aim of the invention is to develop a home appliance comprising a height-adjustable carrier element which is cost-effective, reliable, and easy to assemble and produce.

Description of Drawings

[0013] Embodiments of the home appliance of the invention which is exemplified as a cooling device, an exemplary carrier element, and movement slot used in the device are shown in annexed drawings wherein:

Figure 1 is perspective view of the carrier element in an embodiment in the cooling device.

Figure 2 is top view of the carrier element.

Figure 3 is a view of the movement slot.

Figure 4 is other view of the carrier element moving

in the movement slot in moving state.

Figure 5 is one other view of the carrier element moving in the movement slot in moving state.

Figure 6 is another view of the carrier element moving in the movement slot in moving state.

Figure 7 is one another view of the carrier element moving in the movement slot in moving state.

Figure 8 is a further view of the carrier element moving in the movement slot in moving state.

Figure 9 is yet a further view of the carrier element moving in the movement slot in moving state.

Figure 10 is still a further view of the carrier element moving in the movement slot in moving state.

Figure 11 is other view of the carrier element moving in the movement slot in moving state.

Figure 12 is one other view of the carrier element moving in the movement slot in moving state.

Figure 13 is another view of the carrier element moving in the movement slot in moving state.

Figure 14 is one another view of the carrier element moving in the movement slot in moving state.

Figure 15 is a further view of the carrier element moving in the movement slot in moving state.

Figure 16 is yet a further view of the carrier element moving in the movement slot in moving state.

Figure 17 is still a further view of the carrier element moving in the movement slot in moving state.

Figure 18 is other view of the carrier element moving in the movement slot in moving state.

Figure 19 is one other view of the carrier element moving in the movement slot in moving state.

[0014] The parts in the figures are individually enumerated and the corresponding terms of reference numbers are as follows:

Home appliance	(A)
Movement slot	(B)
Internal compartment	(C)
Side wall	(D)
Carrier element	(1)
Movement element	(2)
Guide	(3, 4, 5)
Holding slot	(3a)
Stopper	(6)
Arm	(7, 8, 9, 10)

Description of the Invention

[0015] In home appliances, in which goods are placed, the height of the carrier elements, on which goods are placed, is able to be changed according to the user desires or the dimensions of the goods placed thereon. The height changing process should be done in a safe way and at the same time without losing power and time. Therefore, the present invention discloses a home appli-

ance comprising a carrier element, the height of which is easily and safely changeable.

[0016] Figure 1 shows a cooling device as an exemplary home appliance (A) comprising a carrier element. Said home appliance (A) comprises at least one carrier element (1), top view of which is shown in figure 2, comprising at least one movement element (2) located at least one edge of the carrier element (1) and at least one movement slot (B), provided on at least one side wall (D) of an internal compartment (C) of the home appliance (A), in which movement element (2) moves. The height of the carrier element (1) is able to be adjusted due to the movement of the movement element (2) in the movement slot (B). The movement element (2) is able to be preferably a wheel or a bearing.

[0017] Figure 3 shows an exemplary movement slot (B) located in the home appliance (A) of the invention. The movement slot (B) comprises guides (3, 4, 5) and arms (7, 8, 9, 10) which are engaged by swivel joint to these guides (3, 4, 5). Guides (3, 4, 5) and arms (7, 8, 9, 10) are preferably in the rod form and the movement element (2) is able to easily move thereon. There are two different types of arms (7, 8, 9, 10) which are engaged to the guides (3, 4, 5). The first-type arm (7, 8) allows the movement element (2) to pass under the arm (7, 8) when there is no load on said arm (7, 8) in its normal position; when there is load on the first-type arm (7, 8), said arm (7, 8) allows the movement element (2) to pass over the arm (7, 8) by rotation of it (7, 8) at the joint axis. In other words, when the movement element (2), which is passed under the first-type arm (7, 8), moves over the arm (7, 8), the arm (7, 8) ensures continuous movement of the movement element (2) by rotating at arm's (7, 8) joint; and after the movement element (2) passing over the arm (7, 8), said arm (7, 8) turns back to its prior position (normal position) again. The second-type arm (9, 10) allows the movement element (2) to pass over it when there is no load on said arm (9, 10) in its normal position. While the movement element (2) is passing under the second-type arm (9, 10), the arm (9, 10) allows the passage of the movement element (2) by rotating at its joint with the force exerted by the movement element (2); after the movement element (2) is passed, the arm (9, 10) enables the movement element (2) to pass over the arm (9, 10) by turning back to its prior position (normal position) again. In order to turning back to prior positions of the arms (7, 8, 9, 10) after the force on the arms (7, 8, 9, 10) removed, they comprise preferably at least one spring (not shown) in their joints.

[0018] Figure 3 shows three different types of guides (3, 4, 5) in an exemplary movement slot (B). At least one holding slot (3a) is located at least at one part of a first-type guide (3) for seating the movement element (2) and at least one first-type arm (7) is engaged to at least one other part of the holding slot (3). A second-type arm (10) is engaged to at least one part of a second-type guide (4). At least one first-type arm (8) is engaged to at least one part of a third-type guide (5), at least one second-

type arm (9) is engaged to one other part of the third-type guide (5).

[0019] First-type arm (8) engaged to third-type guide (5) comprises preferably at least one stopper (6). When a movement element (2) moves over the arm (8), the stopper (6) stops the movement element (2) and assists the arm (8) do the rotating movement on its joint. The stopper (6) is able to open and close on the arm preferably thanks to at least one spring (not shown) or the stopper (6) is able to be a fixed stopper.

[0020] Figures 4 - 19 show an exemplary operation of the invention. In figure 4, the carrier element (1) is fixed at certain height by the settlement of the movement element (2) in a holding slot (3a). When a user wants to change the position (height) of the carrier element (1), the user enables dislocation of the movement element (2) from the holding slot (3a) by firstly moving the carrier element (1) at +x direction. The movement element (2) reaches to the first-type arm (7) engaged to the guide (3), where the holding slot (3a) is located, by moving in the guide (3) as shown in figure 5. The arm (7) comes to an angular position so as to make a negative angle at +x direction by rotating at its joint as shown in figure 6 with the coming of the movement element (2) on it, thus the carrier element (2) moves at -y direction while moving at +x direction at the same time. The arm (7) turns back to its prior position as shown in figure 7 after the movement element (2) passes the arm (7).

[0021] When a user wants to increase the height of the carrier element (1) (when wants to move the carrier element (1) at +y direction), he/she continue to move the carrier element (1) at +x direction. While the carrier element (1) is moving at +x direction, the movement element (2) passes under the arm (9) by rotating the second-type arm (9) engaged to the third-type guide (5) from the joint as shown in figure 8. After the movement element (2) passes under the arm (9), the arm (9) turns back to its prior position as shown in figure 9. After that position, the movement direction of the carrier element (1) is changed and the movement at -x direction is provided. Since the arm (9), which has turned back to its prior position, stands in positive angle at -x direction during the movement of the carrier element (1) at -x direction, the carrier element moves at +y direction. While that movement continues, the movement element (2) rotates the second-type arm (10) engaged to other second-type guide (4) from its joint as shown in figure 10, then passes under that arm (10). After the movement element (2) passes under the arm (10), the arm (10) turns back to its prior position as shown in figure 11. After this state, the direction of the carrier element (1) is changed again and the movement of the carrier element (1) at +x direction is provided. While the carrier element (1) is moving at +x direction, the movement element (2) passes over the arm (10) standing in positive angle at +x direction (which has turned back to its prior position), thus the movement of the carrier element (1) at +y direction is provided. During this movement, the movement element (2) is encountered with an-

other second-type arm (9) engaged to the third-type guide (5) and passes under the arm (9) by rotating the arm (9) around the joint as shown in figure 12. After the movement element (2) passes completely under the arm (9), the arm (9) turns back to its prior position as shown in figure 13. After that state, the movement direction of the carrier element (1) is changed again and the movement at -x direction is provided. While the carrier element (1) is moving at -x direction, the movement element (2) is passing over the arm (9) standing in positive angle at -x direction (which has turned back to its prior position), and the movement of the carrier element (1) at +y direction is ensured at the same time. As the carrier element (1) continues to move at -x direction, the movement element (2) moves over another arm (8) engaged to another part of this third-type guide (5) as shown in figure 14. The arm (8) rotates at its joint by the movement element (2) and with the impact force of the movement element (2) to the stopper (6) on the arm (8) as shown in figure 15. The movement element (2) seats in the holding slot (3a) located in the first-type guide (3) as shown in figure 16 by passing over the arm (8) and therefore it is ensured that the carrier element (1) is fixed at the height raised at +y direction.

[0022] When the user wants to decrease the height of the carrier element (1) (when he/she wants to move the carrier element (1) at -y direction), he/she starts to move the carrier element (1) at +x direction then take the movement element (2) out of the holding slot (3a) and continues to move the carrier element (1) at +x direction. After the movement element (2) passes the arm (7) connected to the guide (3) on which the holding slot (3a) located, as shown in figure 7, the user moves the carrier element (1) at -x direction. The movement element (2) reaches to another first-type arm (8) engaged to the third-type guide (5) by passing under the first-type arm (7) which is engaged to the first-type guide (3) and which has turned back to its prior position as shown in figure 17. This arm (8) rotates at its joint by the movement element (2) and with the impact force of the movement element (2) to the stopper (6) on the arm (8) as shown in figure 18. The movement element (2) seats in the holding slot (3a) located in the first-type guide (3) as shown in figure 19 by passing over the arm (8) and therefore it is ensured that the carrier element (1) is fixed at the height lowered at -y direction.

[0023] With the carrier element (1) and the movement slot (B) of the present invention, the user can change the height of the carrier element (1) by moving the carrier element (1) only back and forth (-x, +x). During the movement of the carrier element (1), the movement element (2) located on the carrier element (1) is always on a guide (3, 4, 5) or on an arm (7, 8, 9, 10). In other words, the movement element (2) is continuously moving on the guides (3, 4, 5) and arms (7, 8, 9, 10). Therefore, since the carrier element (1) does not move in space, it is able to move easily and safely even if it has goods thereon.

Claims

1. A home appliance (A) comprising at least one carrier element (1) having at least one movement element (2) provided on at least one side surface of the carrier element (1); at least one movement slot (B) in which movement element (2) moves and which is located on at least one side surface (D) of at least one internal compartment (C) of the appliance (A) **characterized in that** the movement slot (B) comprises

- at least one first-type guide (3) to at least one side of which at least one first-type arm (7) is connected under which the movement element (2) passes when there is no load on the arm (7) in its normal position and over which the movement element (2) passes by rotation of the arm (7) at the joint axis when there is load on the arm (7);

- at least one second-type guide (4) to at least one side of which at least one second-type arm (10) is connected over which the movement element (2) passes when there is no load on the arm (10) in its normal position and under which the movement element (2) passes by rotation of the arm (10) at the joint axis with the force exerted by the movement element (2) while the movement element (2) is passing under the arm (10), and which turns back to its normal position after the movement element (2) is passed; and

- at least one third-type guide (5) to at least one side of which at least one first-type arm (8) is connected and to at least one side of which at least one second-type arm (9) is connected.
2. A home appliance (A) according to claim 1 **characterized in that** the movement slot (B) comprises at least one holding slot (3a) which is located on at least one part of the first-type guide (3) into which the movement element (2) is seated.
3. A home appliance (A) according to claim 1 **characterized in that** the movement element (2) is a wheel.
4. A home appliance (A) according to claim 1 **characterized in that** the guides (3, 4, 5) and the arms (7, 8, 9, 10) are in the rod form.
5. A home appliance (A) according to claim 1 **characterized in that** the first-type arm (8) connected to the third-type guide (5) comprises at least one stopper (6).
6. A home appliance (A) according to claim 5 **characterized in that** the stopper (6) is able to open and close on the arm (8).
7. A home appliance (A) according to claim 6 **characterized in that** the stopper (6) comprises at least one spring located on the arm (8).
8. A home appliance (A) according to claim 5 **characterized in that** the stopper (6) is fixed on the arm (8).
9. A home appliance (A) according to claim 1 **characterized in that** the arm (7, 8, 9, 10) comprises at least one another spring in their joints.

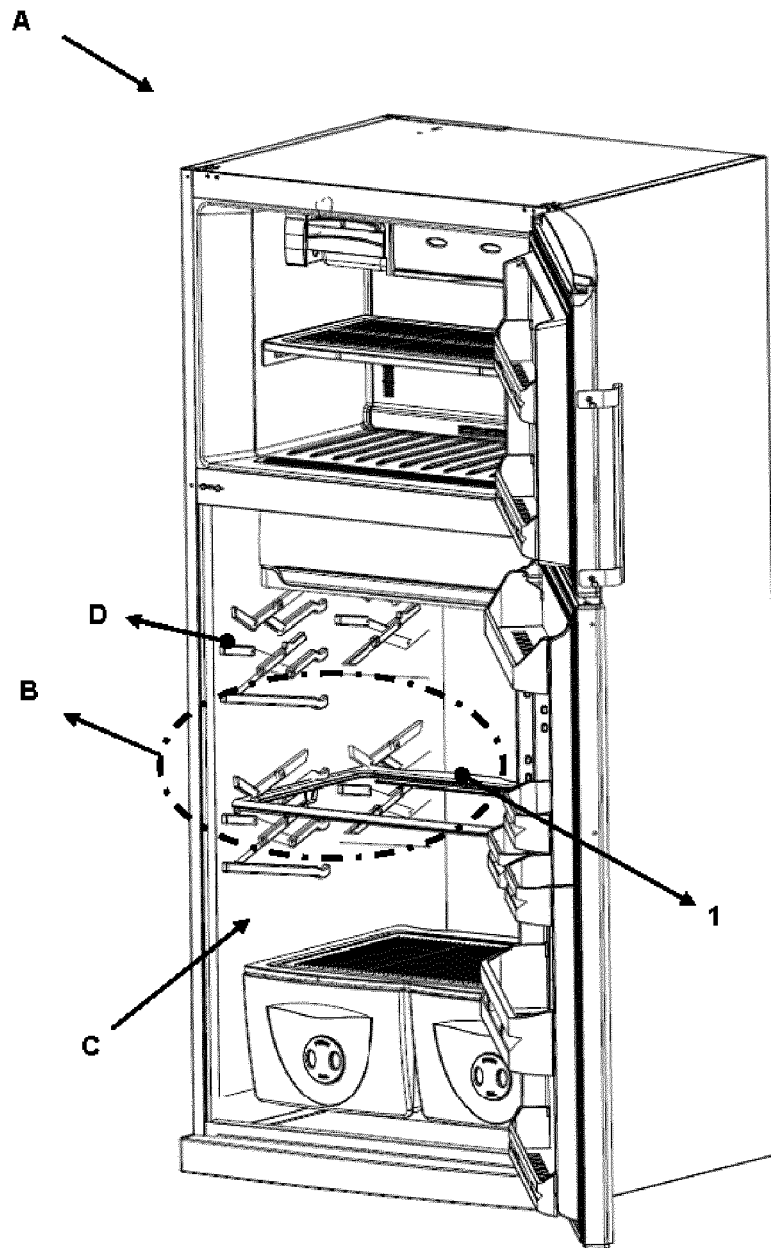


Figure – 1

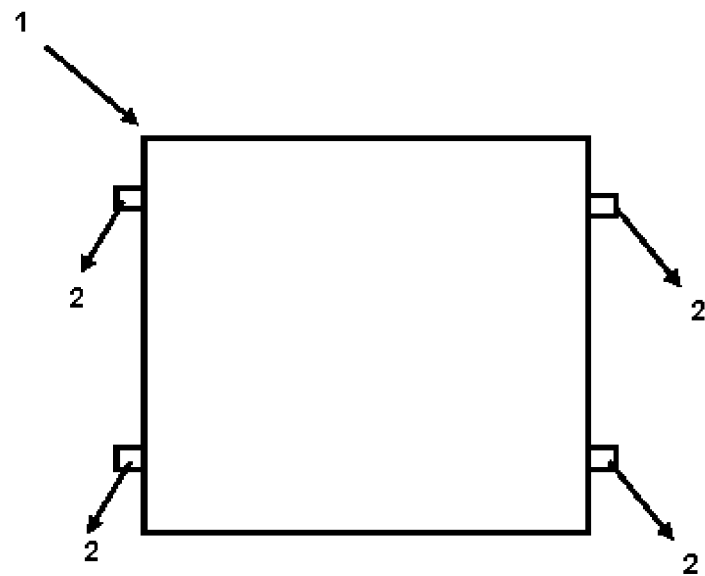


Figure - 2

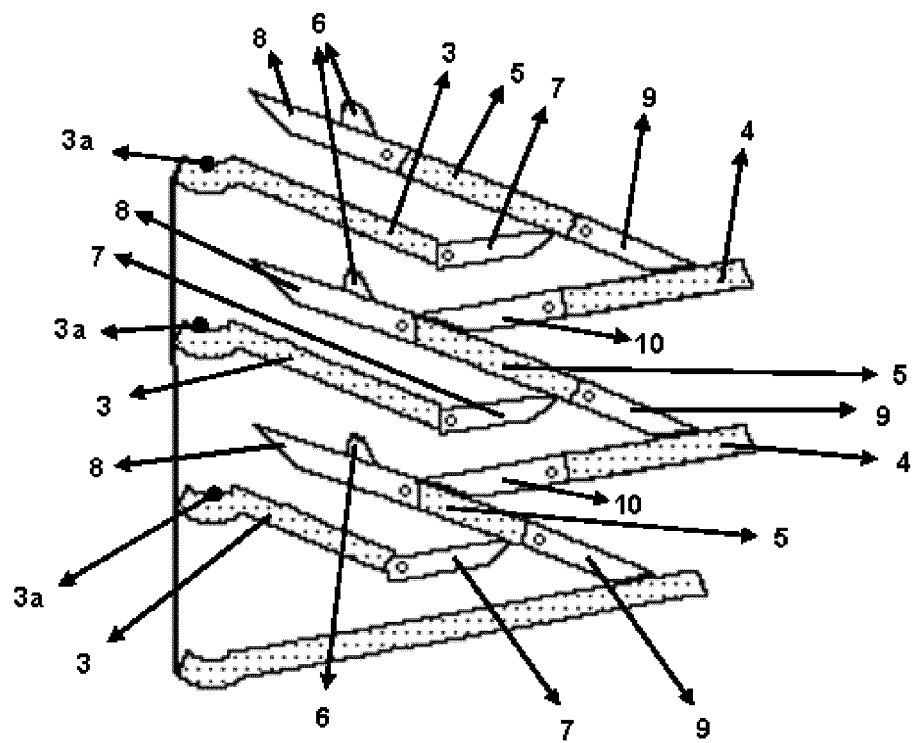


Figure - 3

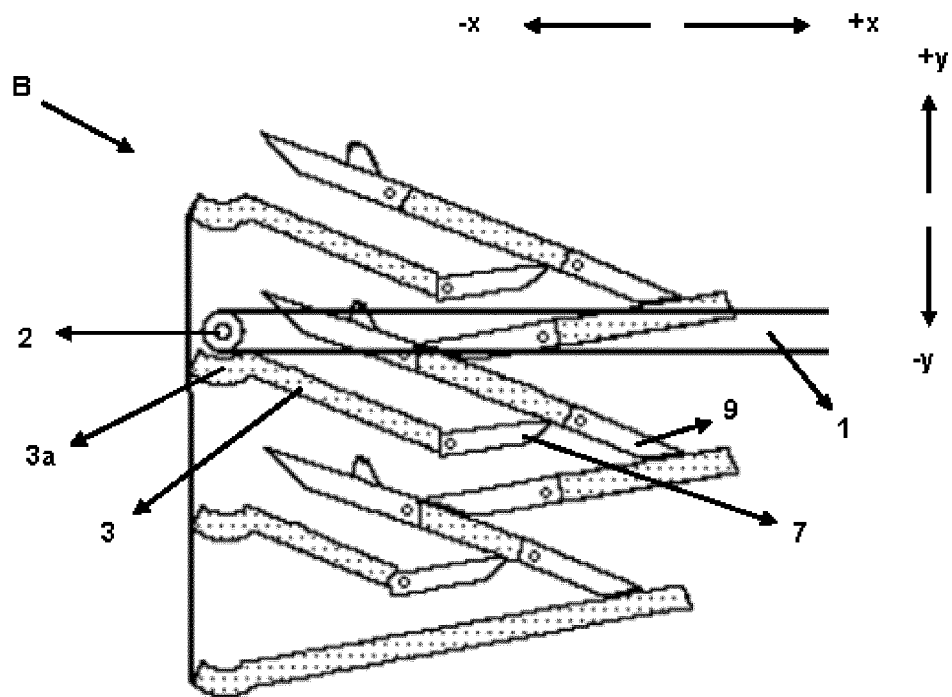


Figure -4

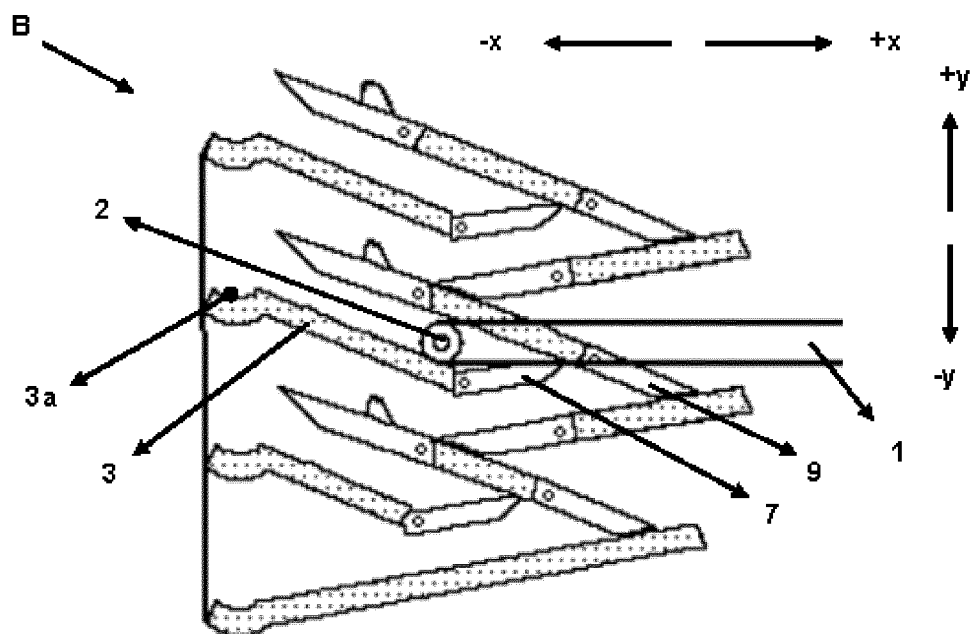


Figure -5

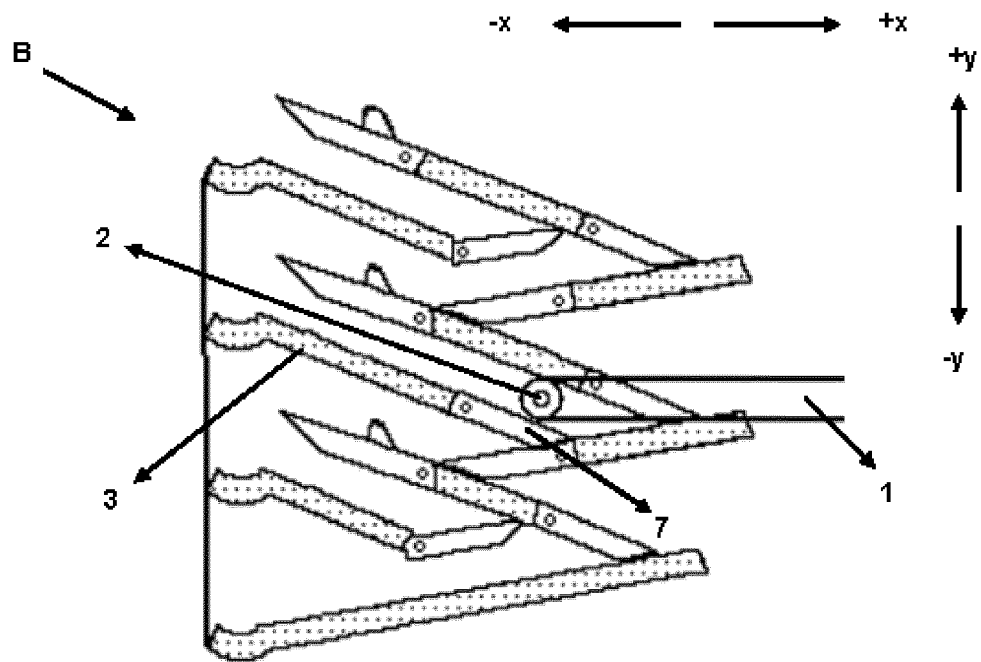


Figure - 6

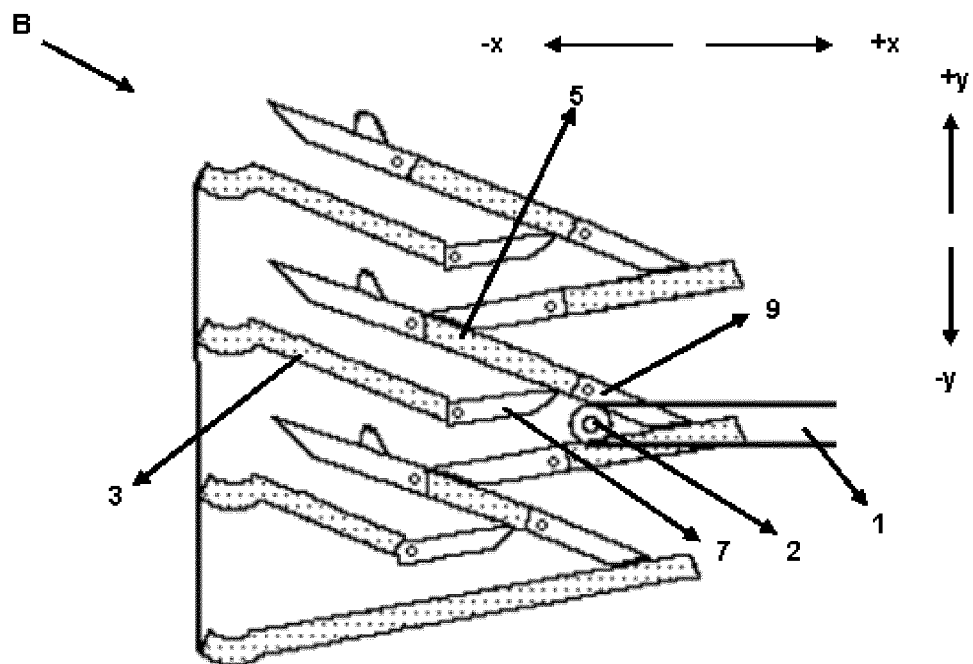


Figure - 7

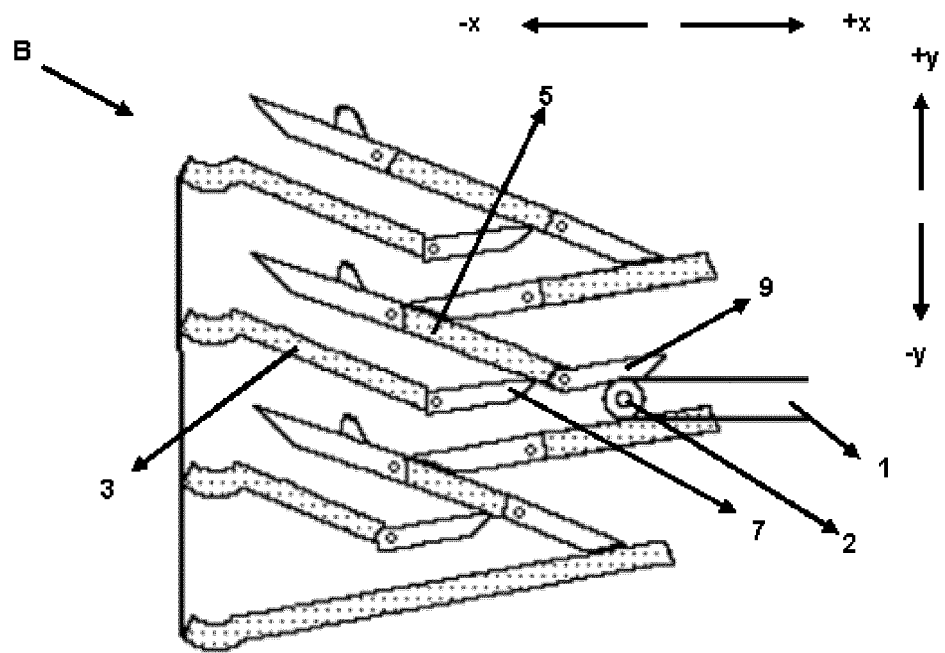


Figure - 8

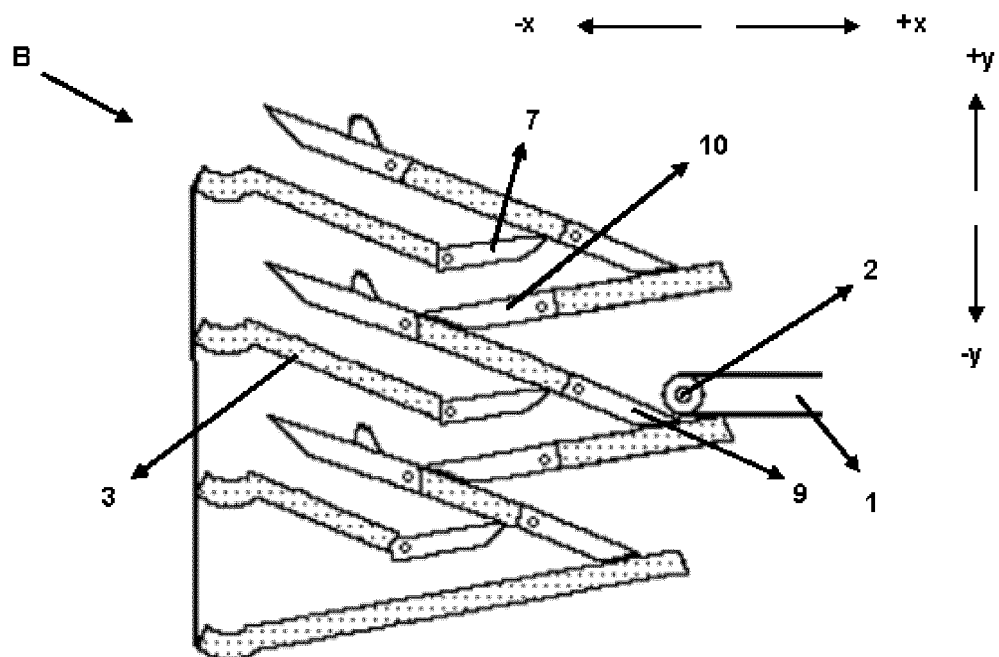


Figure - 9

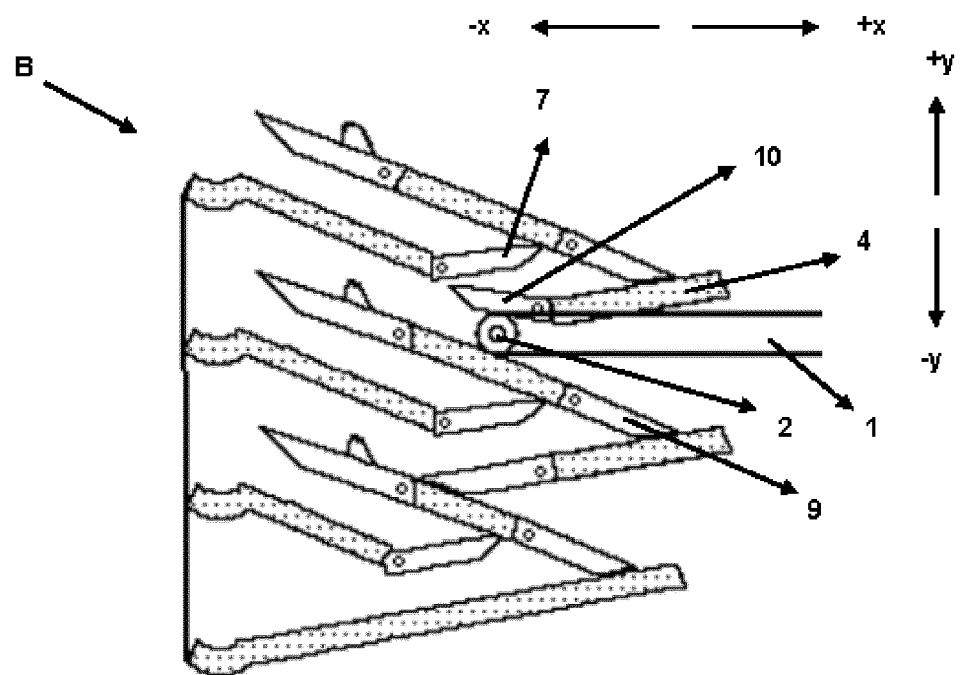


Figure - 10

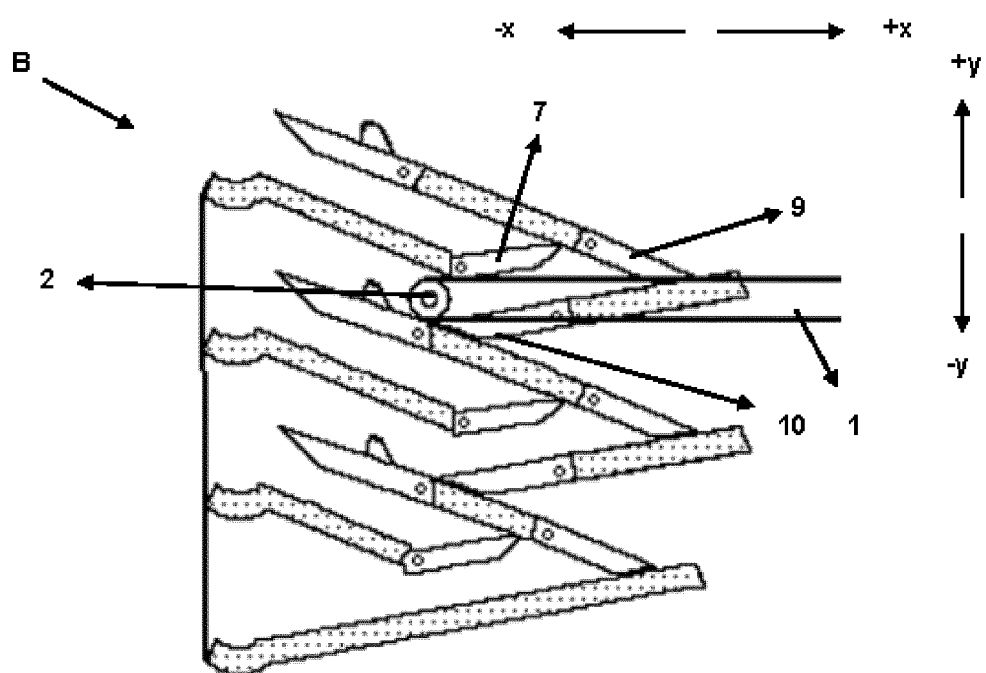


Figure - 11

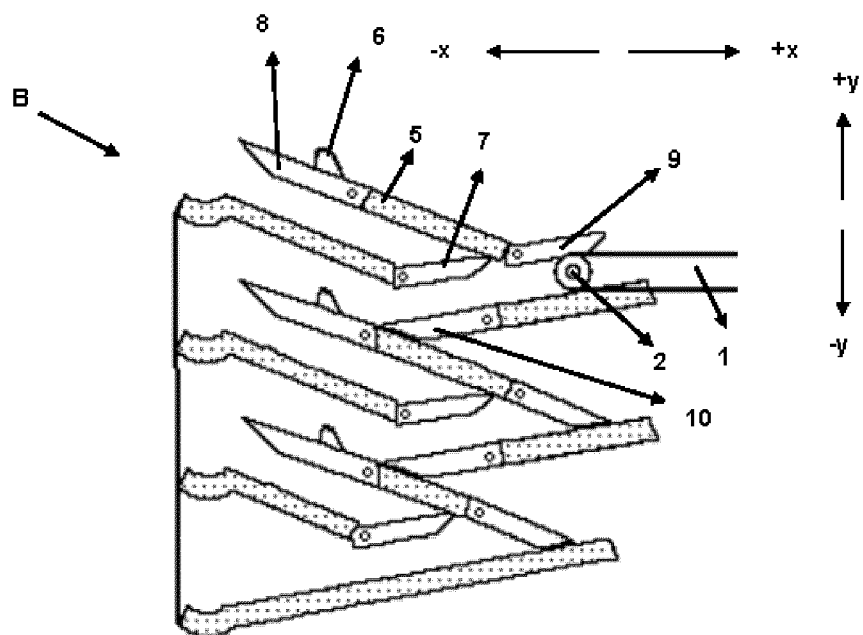


Figure - 12

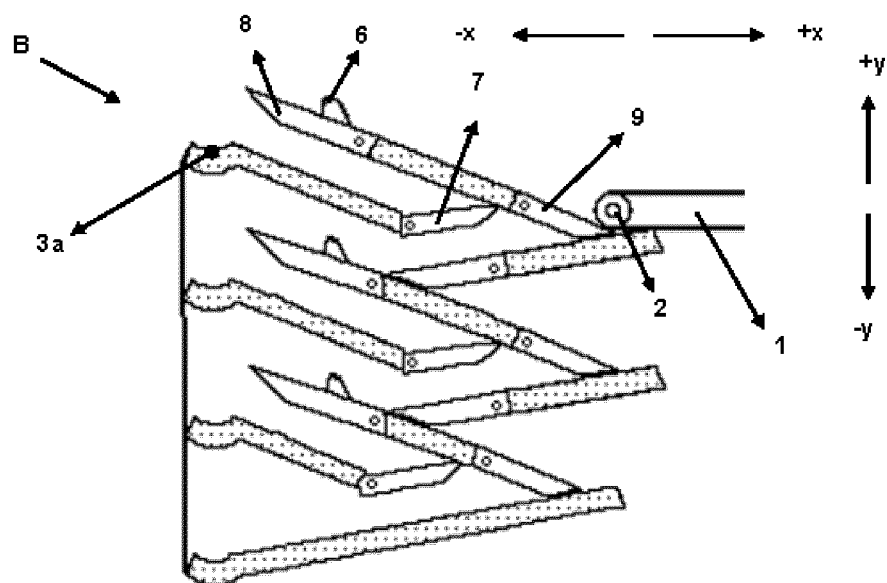


Figure - 13

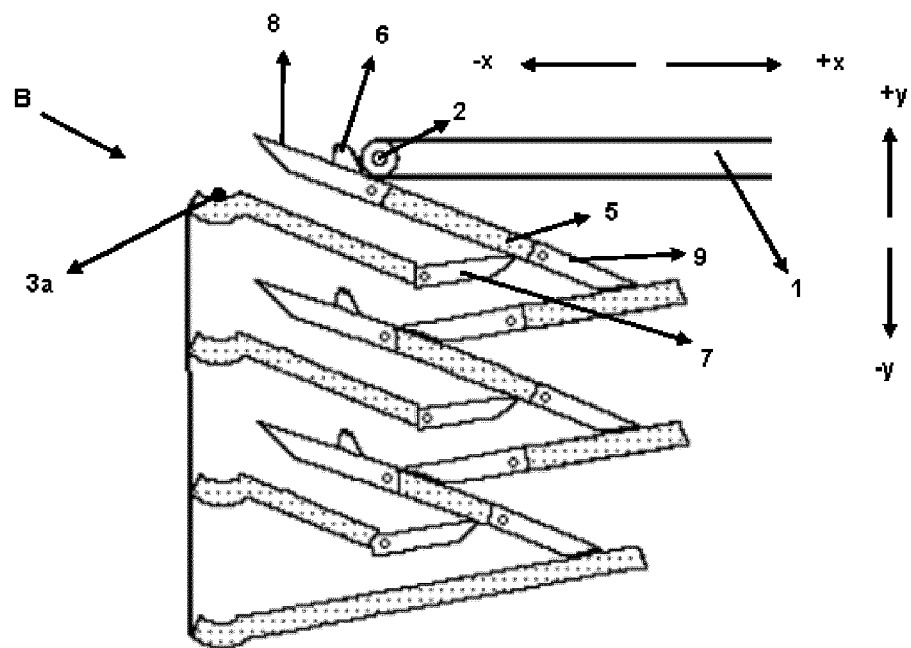


Figure - 14

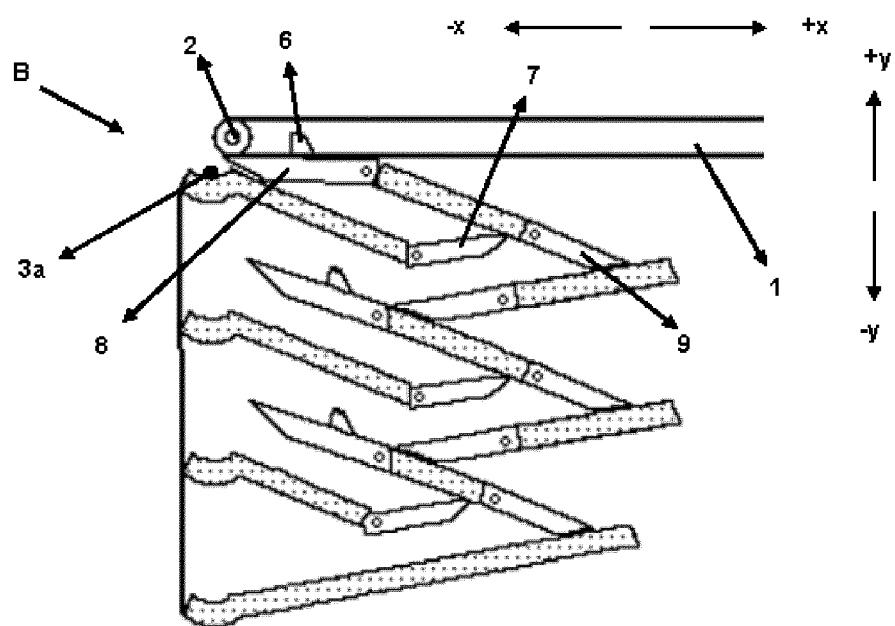


Figure - 15

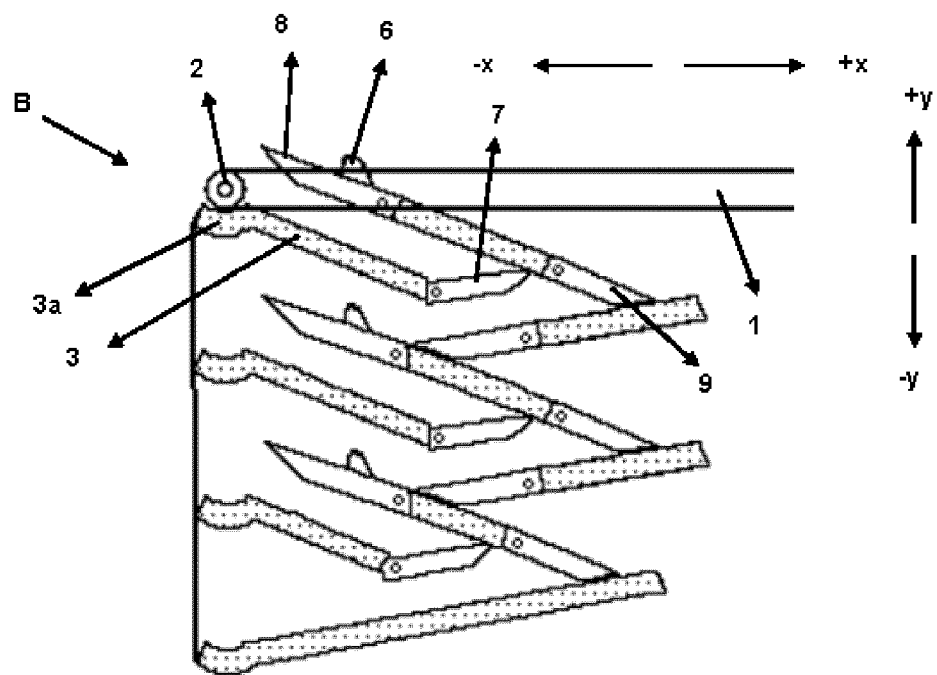


Figure – 16

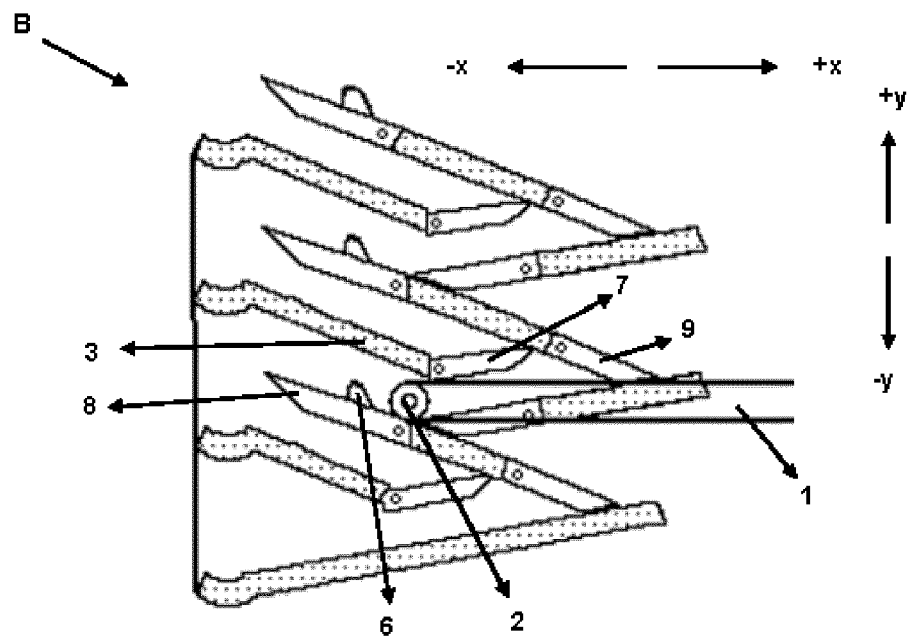


Figure - 17

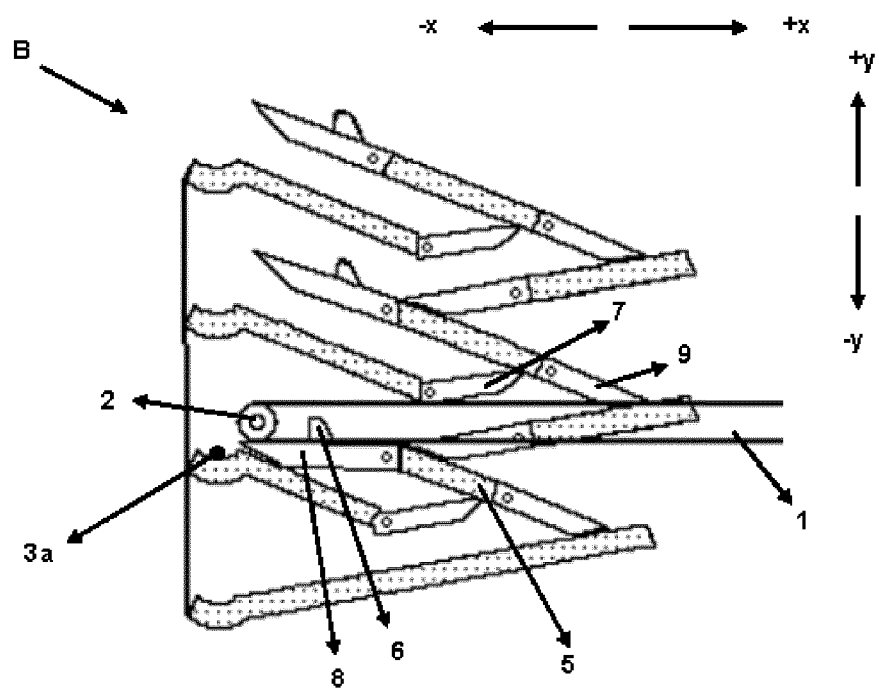


Figure - 18

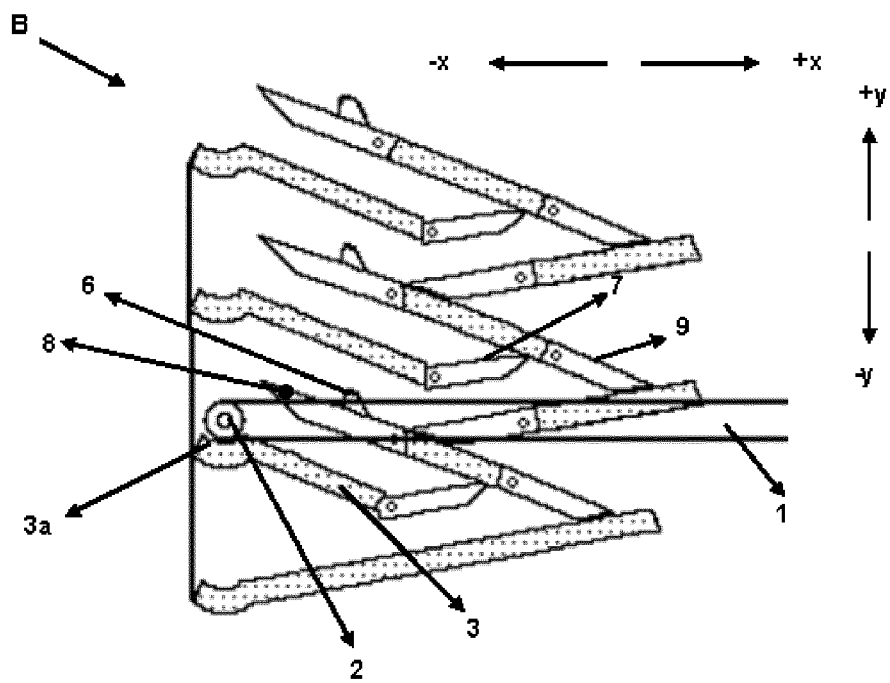


Figure - 19

REFERENCES CITED IN THE DESCRIPTION

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