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(54) **SCREEN TRANSPORTATION DEVICE**

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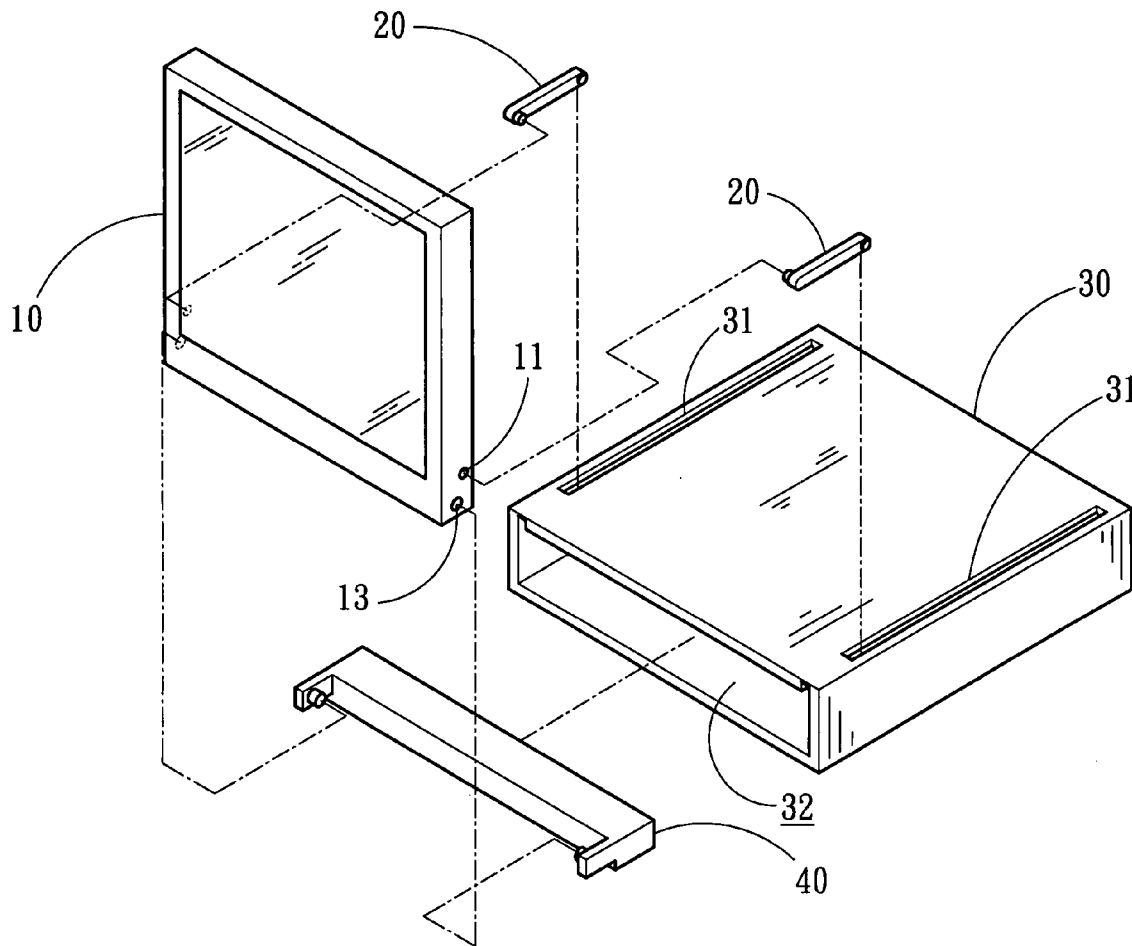
(57) **ABSTRACT**

A screen transportation device has a frame; a carrier being movable between a first position and a second position; a linkage having one end pivoted with a first connecting part on the carrier and another end slid along and pivoted with the frame; and a guiding device pivoted with a second connecting part on the carrier and being movable in the frame; wherein the carrier is able to pivot with the second connecting part on the carrier between a first angle and a second angle.

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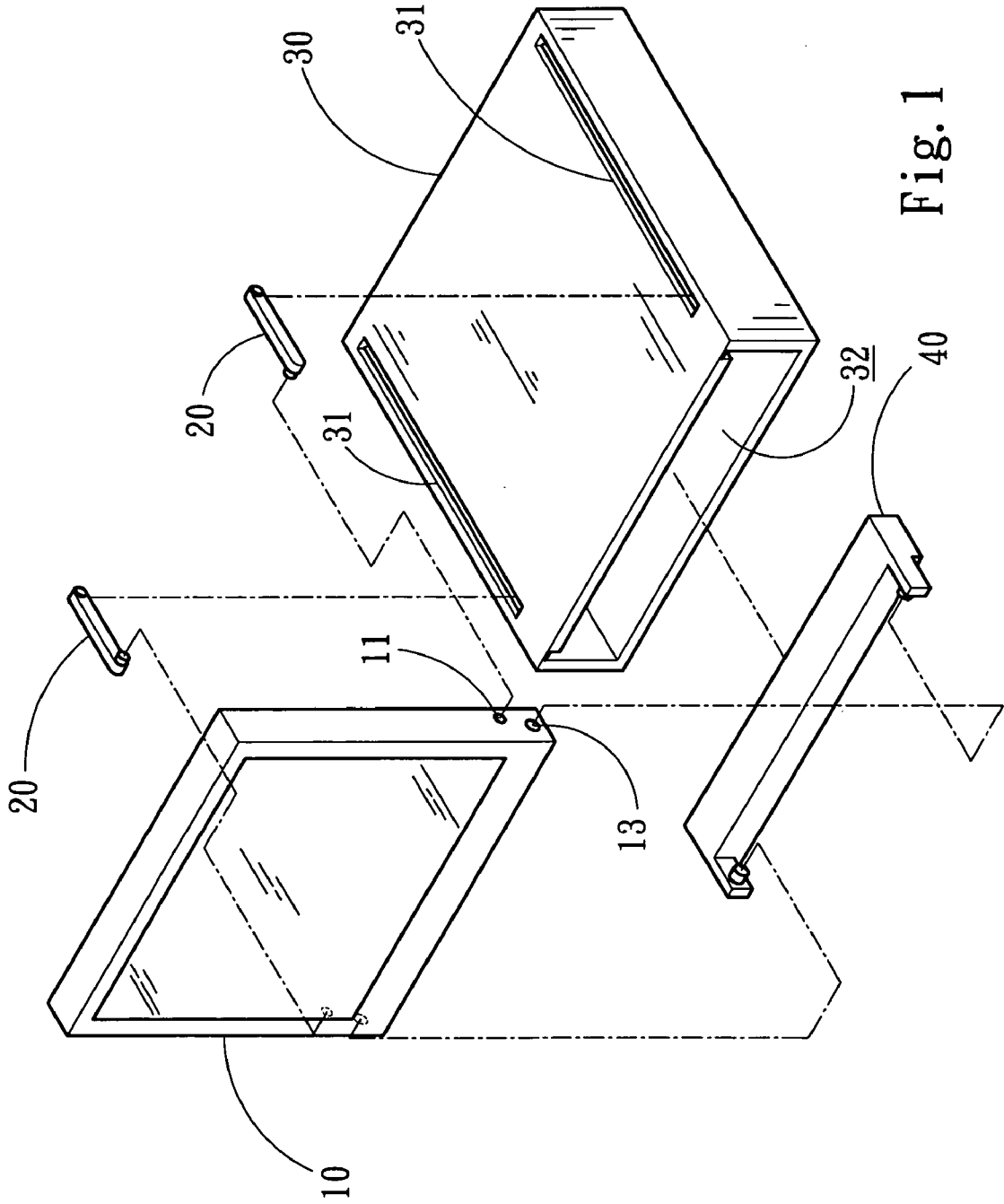


Fig. 1

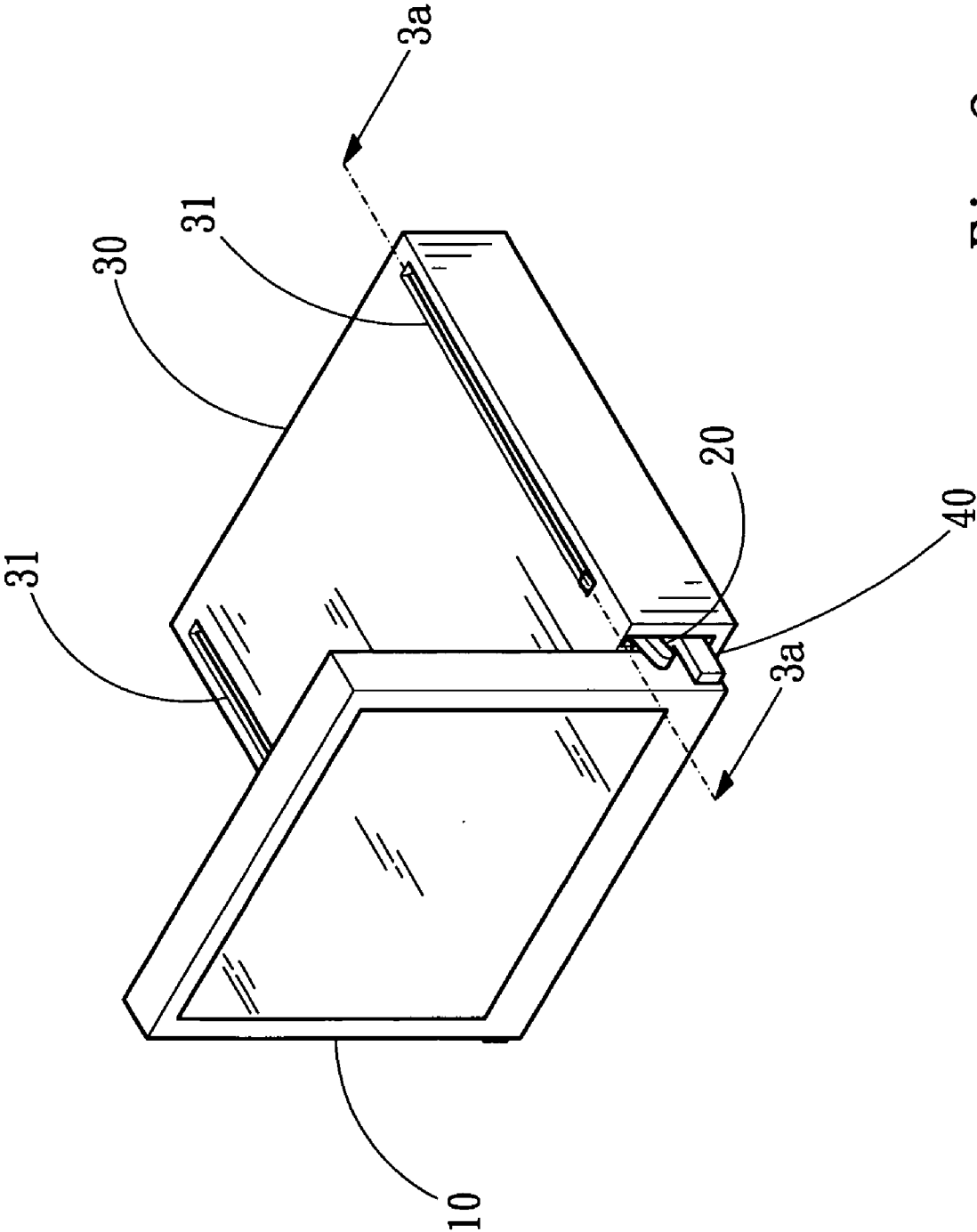


Fig. 2

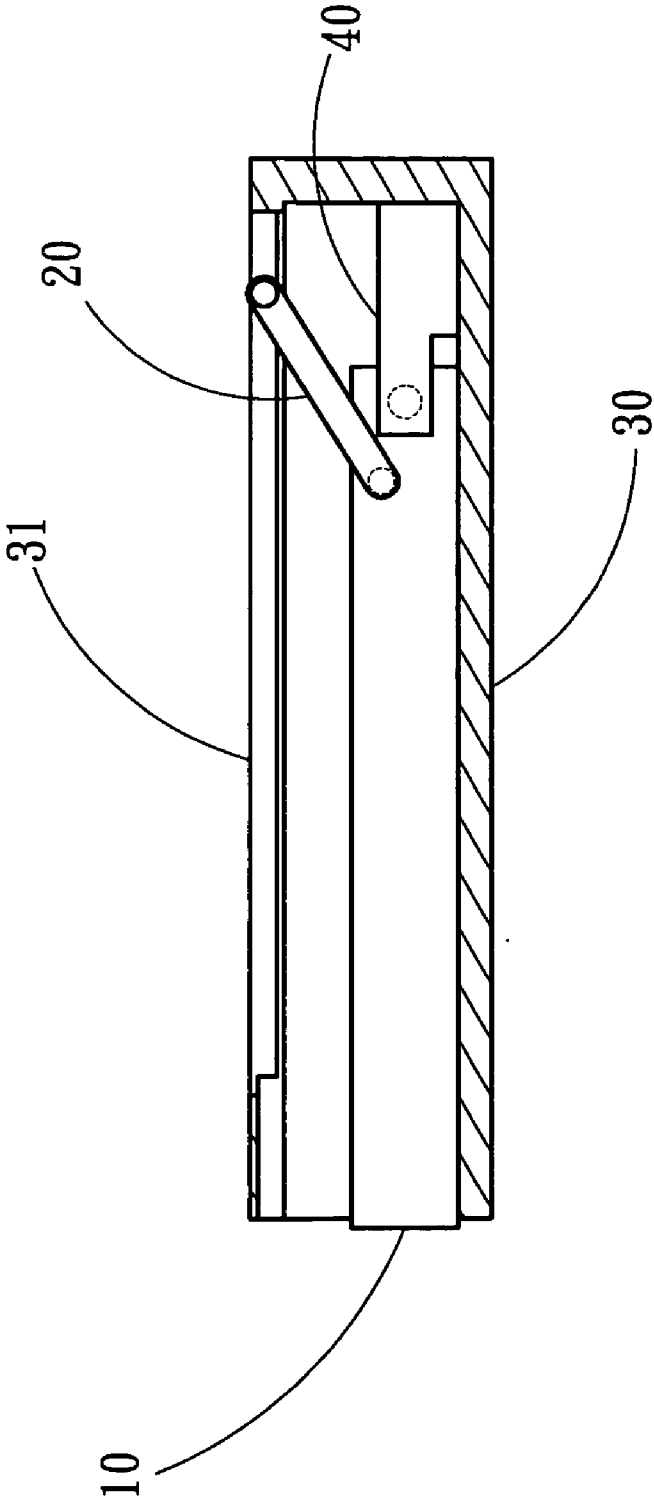


Fig. 3a

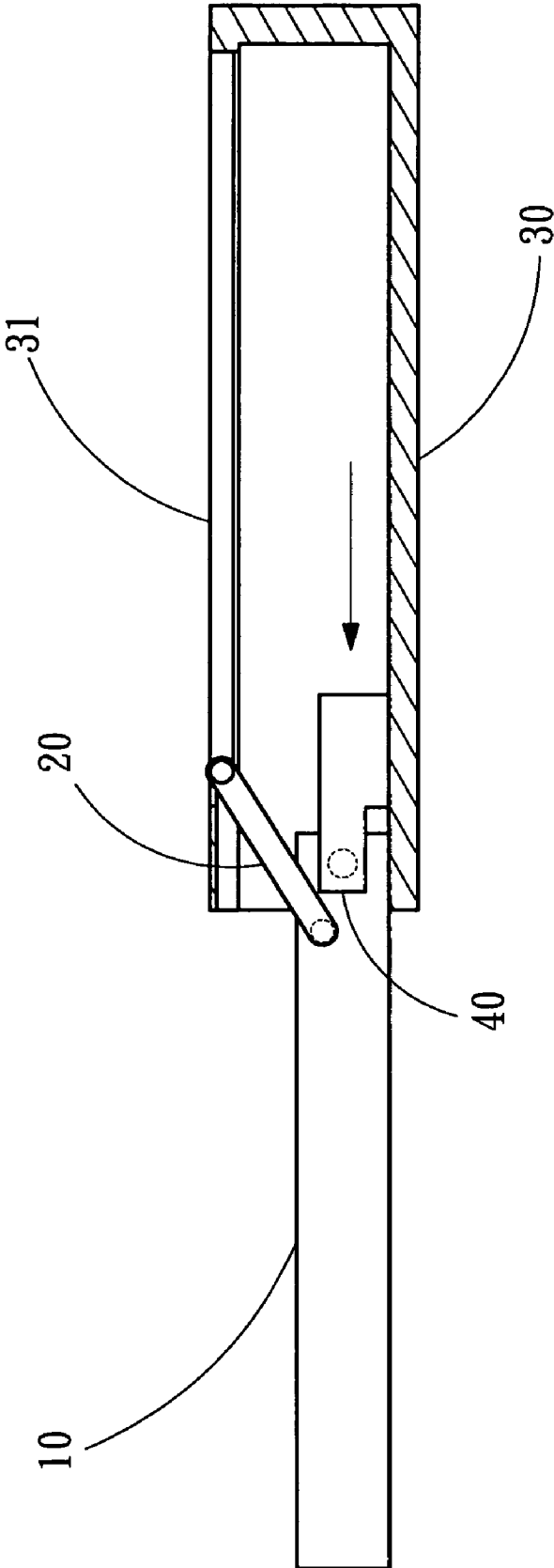


Fig. 3b

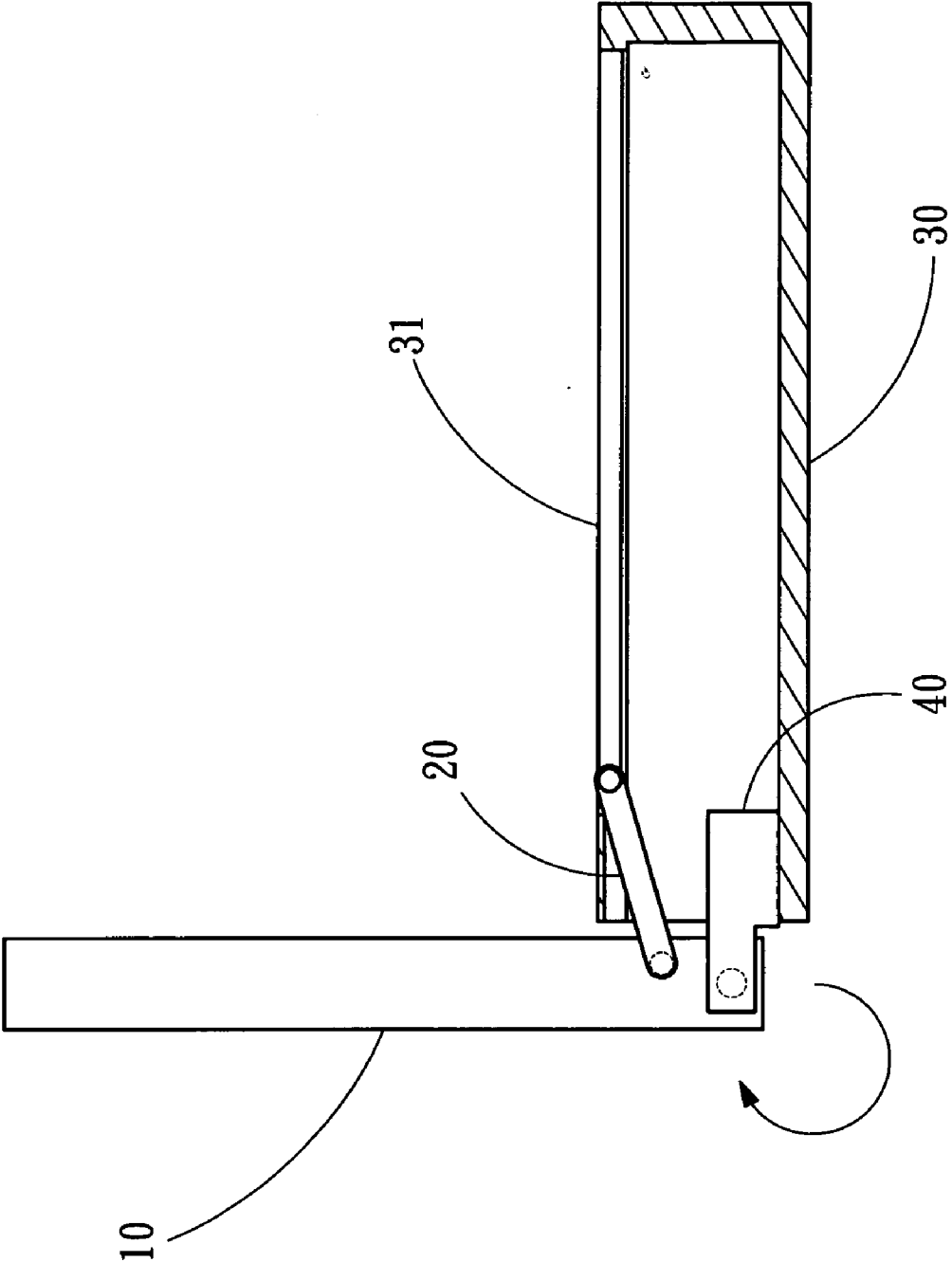


Fig. 3C

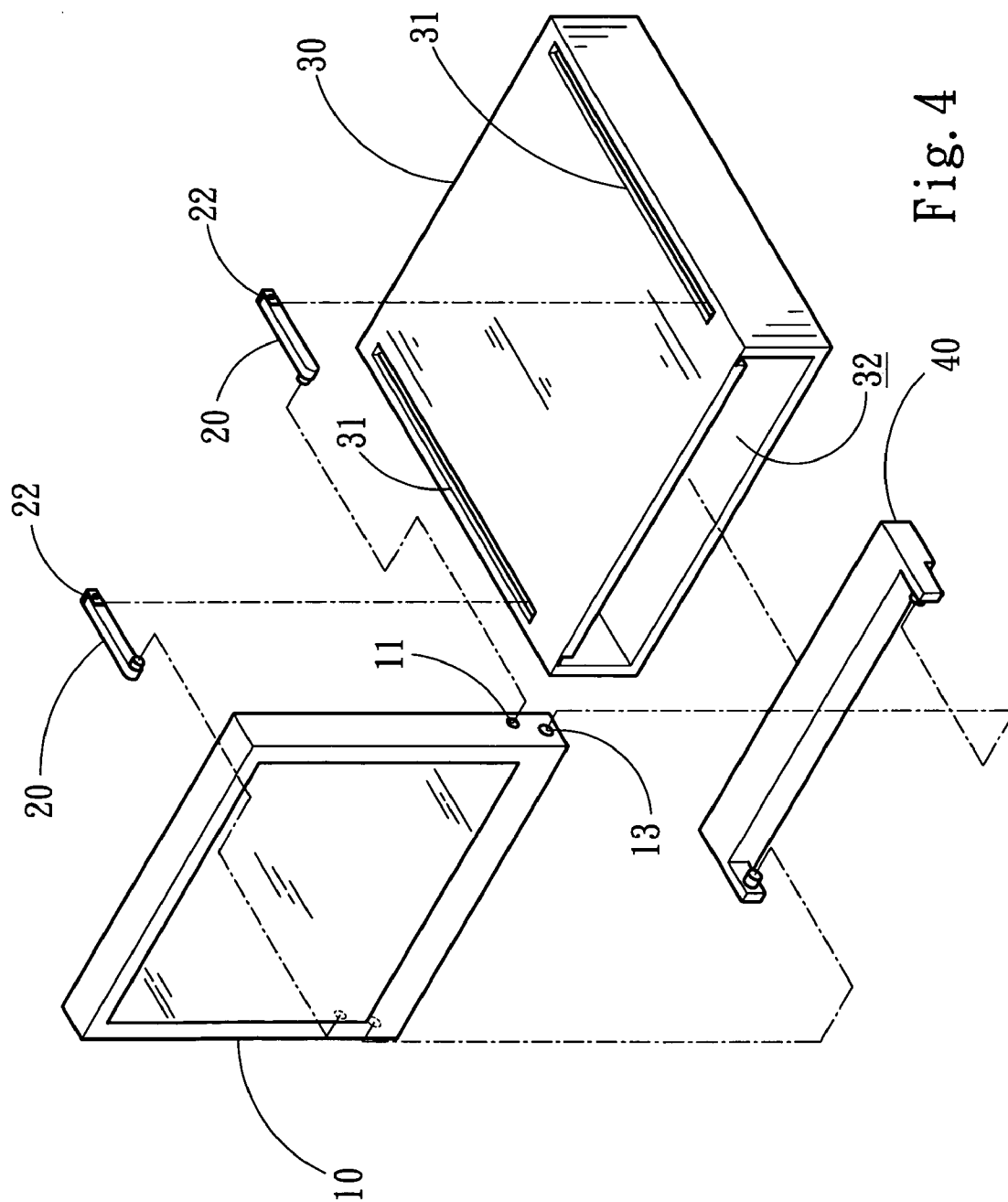


Fig. 4

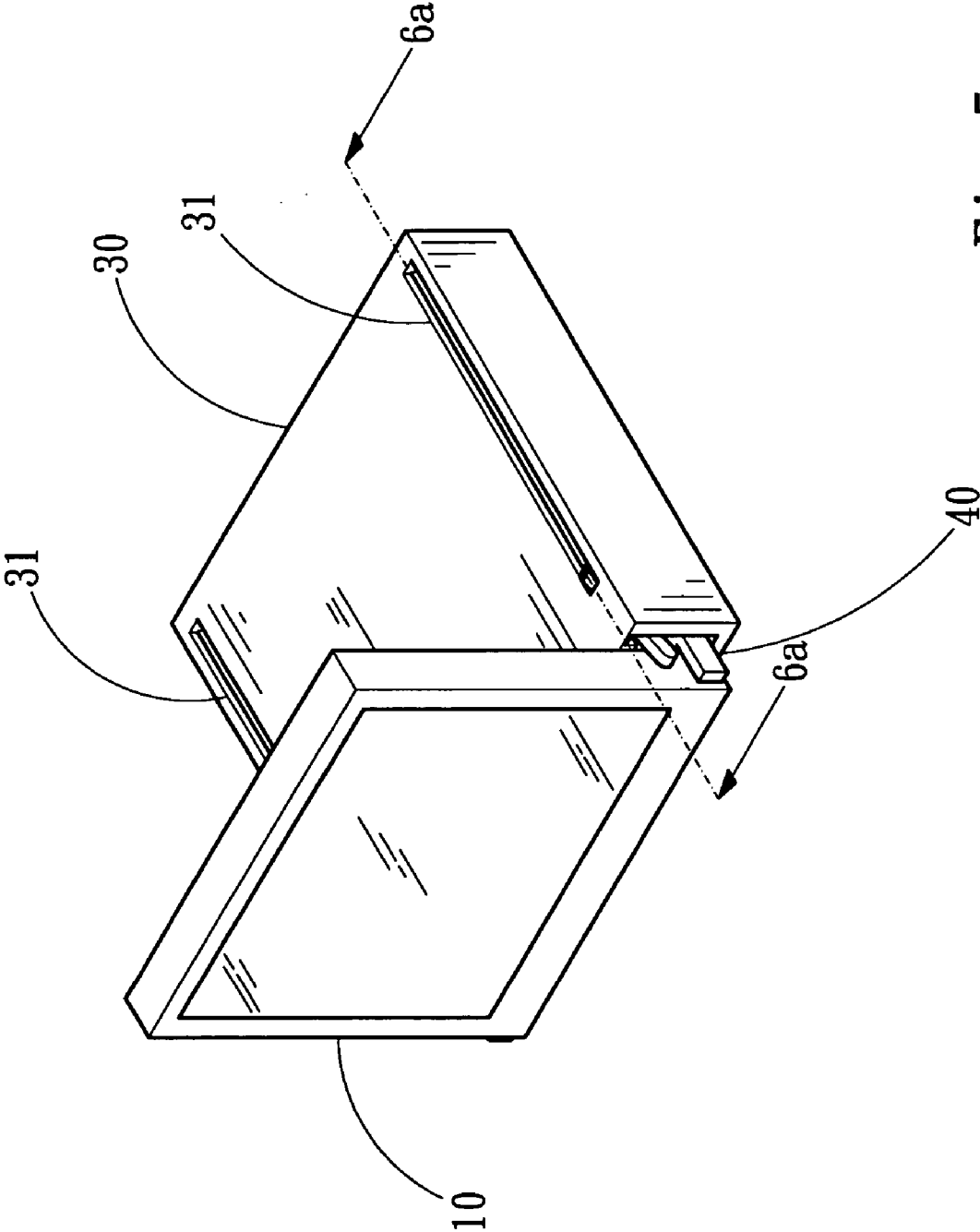


Fig. 5

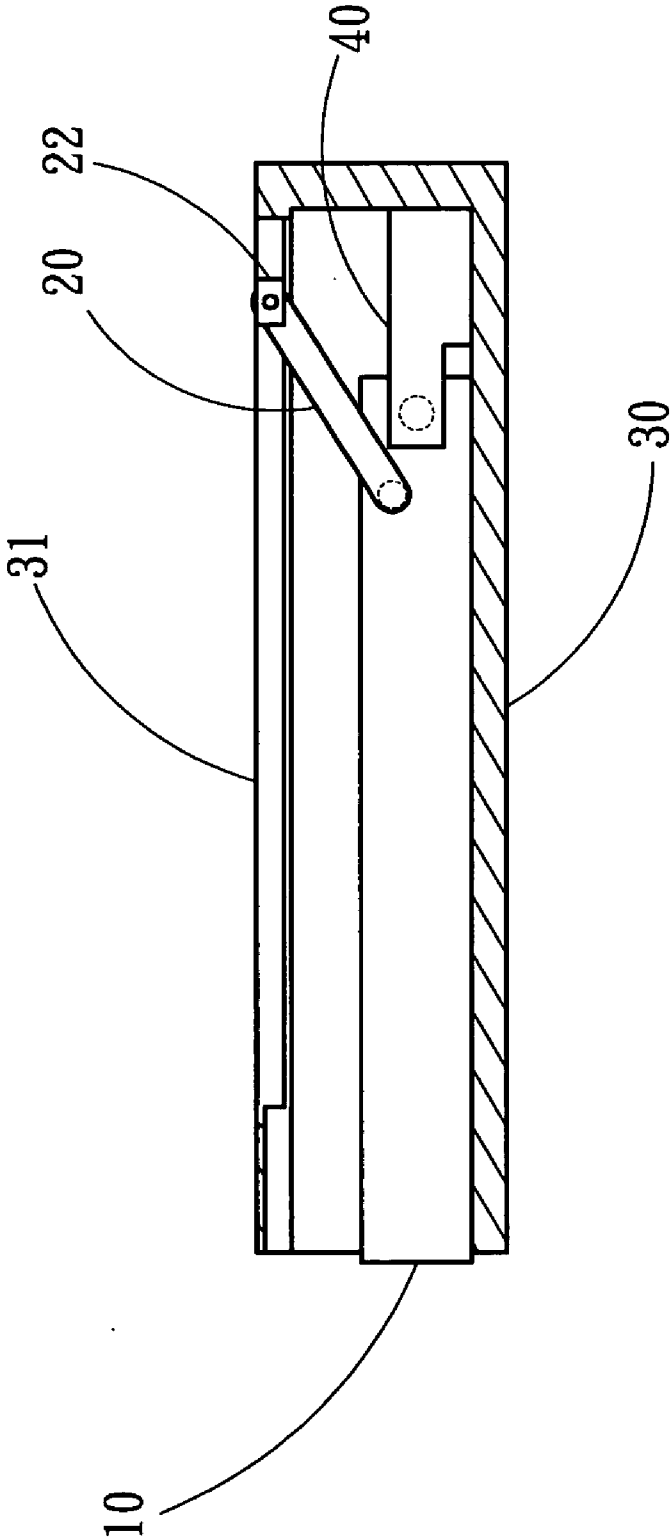


Fig. 6a

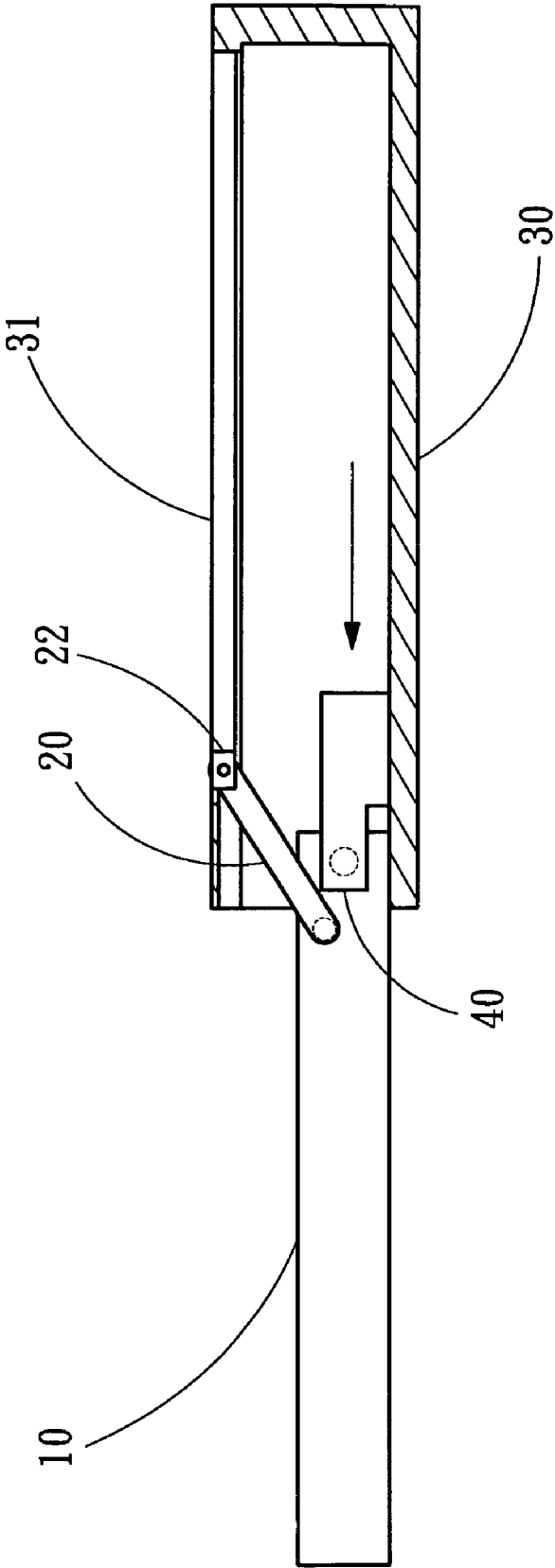


Fig. 6b

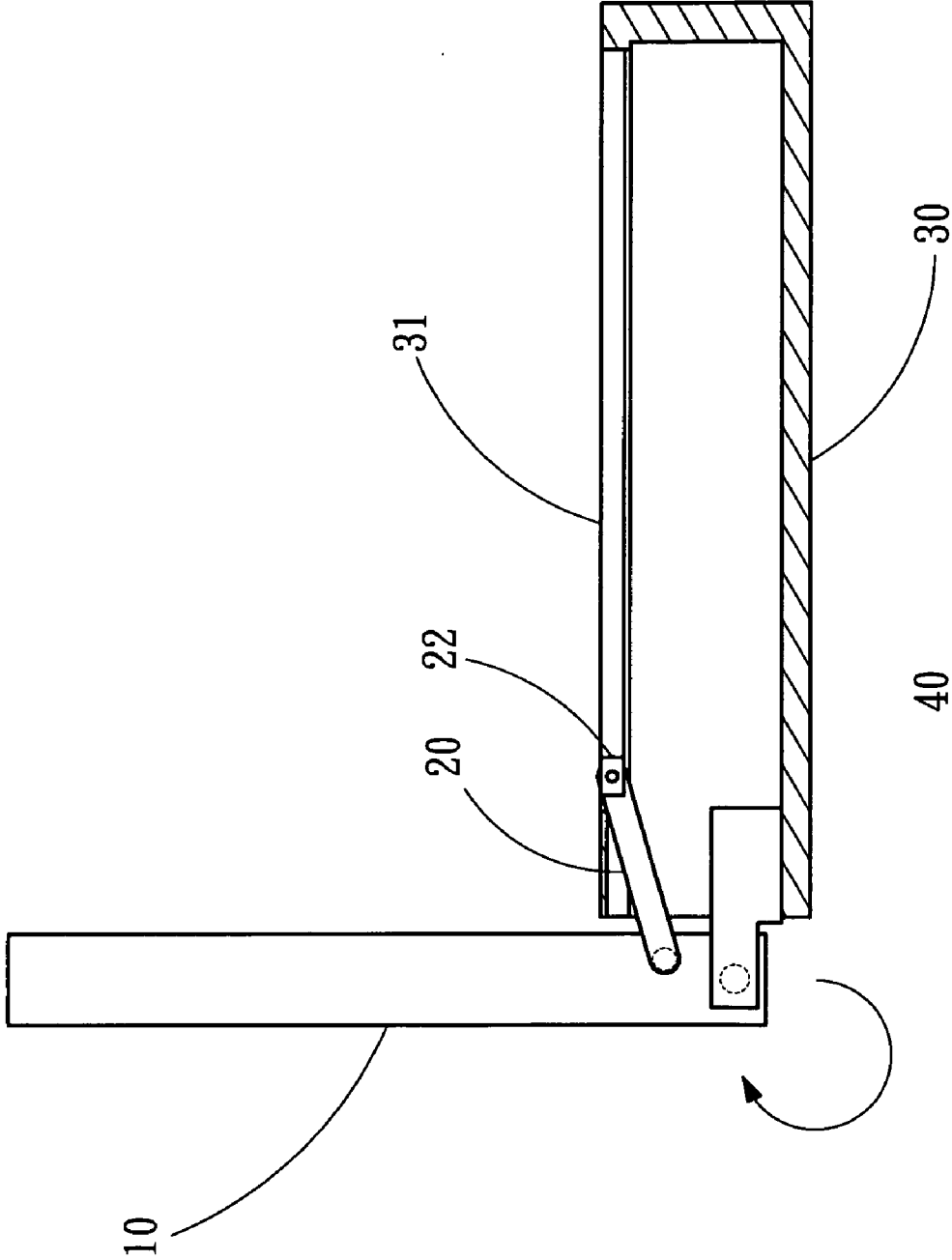


Fig. 6C

SCREEN TRANSPORTATION DEVICE

FIELD OF THE INVENTION

[0001] The present invention relates to a screen transportation device, and in particular to a transportation device for a liquid crystal display in a vehicle.

BACKGROUND OF THE INVENTION

[0002] A translation apparatus for a liquid crystal displayer in automobile has several types to adapt users' needs. One of the prior arts is manual while the other is automatic. However, people are not satisfied with those products, and more accommodative, convenient, and rapidly are concerned.

[0003] Generally, a liquid crystal display in a vehicle is provided for watching TV or displaying some information. One kind of the liquid crystal display declared in the patent No. 381803 issued from Taiwan has a panel located on a regular shelf. It must be mounted on the shelf and always is installed on the driving assistant's bracket so that the panel can't be ensconced but soiled.

[0004] In view of this, there is another kind of the liquid crystal display that has a scalable panel. Therefore, the panel can be taken in a case by a mechanical driven device declared in the patent No. 502850 issued from Taiwan. However, because this device provides a active force with an elastic component which makes the panel move between a first position and a second position in the case, the elastic component could be elastic fatigue under frequently used for a long time. That causes the panel to be disabled and inconvenient.

[0005] As the reasons above, there is a more another kind of the liquid crystal display that has a scalable panel without any elastic component declared in the patent No. 265920 issued from Taiwan. In that patent, there are two motor installed in the device. The one is driven a mechanism to take the panel in or bringing the panel out of a case, and the other is driven the panel to turn into a vertical state or a horizontal state. Therefore, this device causes the waste of the electricity and cost.

[0006] Thus the present invention is aimed to provide a translation apparatus that overcomes the drawbacks of the prior art.

SUMMARY OF THE INVENTION

[0007] A primary objective of the present invention is to provide a screen transportation device comprising a linkage and a guiding device that constrain a transportation of a screen and uses only one motor.

[0008] Another objective of the present invention is to provide the said screen transportation device with respect to contain the panel and pull it out for viewing the liquid crystal display.

[0009] In accordance with the present invention, to realize the above objectives, a screen transportation device has a frame; a carrier being movable between a first position and a second position; a linkage having one end pivoted with a first connecting part on the carrier and another end slid along and pivoted with the frame; and a guiding device pivoted with a second connecting part on the carrier and being

movable in the frame; wherein the carrier is able to pivot with the second connecting part on the carrier between a first angle and a second angle.

[0010] The present invention will become more obvious from the following description when taken in connection with the accompanying drawings, which show, for purposes of illustration only, a preferred embodiment in accordance with the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] **FIG. 1** is an exploded view in accordance with one embodiment of the invention.

[0012] **FIG. 2** is a perspective view in accordance with the embodiment of the invention.

[0013] **FIG. 3a** is a sectional view in accordance with the embodiment of the invention at the first position.

[0014] **FIG. 3b** is a sectional view in accordance with the embodiment of the invention at the second position.

[0015] **FIG. 3c** is a sectional view in accordance with the embodiment of the invention at the third position.

[0016] **FIG. 4** is an exploded view in accordance with another embodiment of the invention.

[0017] **FIG. 5** is a perspective view in accordance with the second embodiment of the invention.

[0018] **FIG. 6a** is a sectional view in accordance with the second embodiment of the invention at the first position.

[0019] **FIG. 6b** is a sectional view in accordance with the second embodiment of the invention at the second position.

[0020] **FIG. 6c** is a sectional view in accordance with the second embodiment of the invention at the third position.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0021] Referring to **FIGS. 1 and 2** for a first embodiment of the invention, a screen transportation device includes a panel **10**, two linkages **20**, a frame **30**, and a guiding device **40**. The frame **30** has two linear slots **31** formed respectively on opposed sides of the frame **30** and an opening **32** defined in a front side of the frame **30**. Each of the linkages **20** has one end pivoted with one of first connecting parts **11** on opposed sides of the panel **10**, and has another end slid along and pivoted with a respective one of the linear slots **31** of the frame **30**. Two opposed sides of the guiding device **40** are respectively pivoted with second connecting parts **13** on opposed sides of the panel **10**, and each side of the first connecting parts **11** and second connecting parts **13** are not aligned in a horizontal direction of the panel **10**. The guiding device **40** is slid along inside of the frame **30**. The screen transportation device equipped with a motor (not shown). The motor is installed on the guiding device **40** and functions as a driver to move the guiding device **40** along a longitudinal direction of the frame **30** while the panel **10** moves with the guiding device **40**. Besides, the screen transportation device has a controller (not shown) to command the operation of the motor.

[0022] Referring to **FIGS. 3a, 3b and 3c** for an embodiment of the invention, **FIG. 3a** is a sectional view in accordance with a cutting line **3a-3a** shown in **FIG. 2**, **FIG.**

3b is a sectional view in accordance with the embodiment of the invention at the second position, **FIG. 3c** is a sectional view in accordance with the embodiment of the invention at the third position. At the first position shown in **FIG. 3a**, the panel **10** stays in the frame **30** initially. After a user starts the motor by the controller, the motor drives the guiding device **40** to move to the opening **32** along the slots **31**, and the guiding device **40** moves the panel **10** horizontally with the linkages **20** until it achieves the second position shown in **FIG. 3b** wherein the panel **10** is pulled out of the frame **30**. At the same time, the motor drives the guiding device **40** continuously and makes the panel **10** keep moving outwards. The linkages **20** stop at the slots **31** and respectively pull the first connecting parts **11** on opposed sides of the panel **10**, because the sliding stroke of the guiding device **40** is longer than the longitudinal distance of the slot **31**. The panel **10** pivots with the linkages **20** and turns into a vertical state at the third position shown in **FIG. 3c**.

[0023] When the user wants to return the panel **10** to the stored state, the user can start the motor by using the controller. The motor drives the guiding device **40** to move inside along the frame **30** so that the panel **10** turns from the third position shown in **FIG. 3c** into the second position shown in **FIG. 3b**. Then, the motor keeps the guiding device **40** moving inwards, and the guiding device **40** brings the linkages **20** to move along the slot **31** until the panel **10** achieves the first position shown in **FIG. 3a**.

[0024] Referring to **FIGS. 4 and 5**, **FIG. 4** is an exploded view in accordance with another embodiment of the invention, and **FIG. 5** is a perspective view of **FIG. 4**. The screen transportation device includes a panel **10**, two linkages **20**, a frame **30**, two sliders **22**, and a guiding device **40**. The frame **30** has two linear slots **31** formed respectively on opposed sides of the frame **30** and an opening **32** formed on a front side of the frame **30**. Each of the linkages **20** has one end pivoted with one of first connecting parts **11** on opposed sides of the panel **10**, and has another end pivoted with a respective one of the sliders **22**. The sliders **22** are slid along the slots **31** respectively. Two opposed sides of the guiding device **40** are respectively pivoted with second connecting parts **13** on opposed sides of the panel **10**, and each side of the first connecting parts **11** and second connecting parts **13** are not aligned in a longitudinal direction of the panel **10**. The guiding device **40** is slid along inside of the frame **30**. The screen transportation device has a motor (not shown). The motor is installed on the guiding device **40** and functions as a driver to move the guiding device **40** along a longitudinal direction of the frame **30** while the panel **10** moves with the guiding device **40**. Besides, the screen transportation device has a controller (not shown) to command the operation of the motor.

[0025] Referring to **FIGS. 6a, 6b and 6c**, **FIG. 6a** is a sectional view in accordance with a cutting line **6a-6a** shown in **FIG. 5** at the first position, **FIG. 6b** is a sectional view in accordance with the embodiment of the invention at the second position, **FIG. 6c** is a sectional view in accordance with the embodiment of the invention at the third position. At the first position shown in **FIG. 6a**, the panel **10** stays in the frame **30** initially. After a user starts the motor by the controller, the motor drives the guiding device **40** to move to the opening **32** along the slots **31**, and the guiding device **40** brings the panel **10** to go horizontally with the linkages **20** until it achieves the second position shown in

FIG. 6b wherein the panel **10** is pulled out of the frame **30**. At the same time, the motor drives the guiding device **40** continuously and makes the panel **10** keep moving outwards. The sliders **22** make the linkages **20** stop at the slots **31** and respectively pull the first connecting parts **11** on opposed sides of the panel **10**, because the sliding stroke of the guiding device **40** is longer than the stroke of the sliders **22**. The panel **10** pivots with the linkages **20** and turns into a vertical state at third position shown in **FIG. 6c**.

[0026] When the user wants to return the panel **10** to its stored status, the user can start the motor by using the controller. The motor drives the guiding device **40** to move inside along the frame **30** linearly so that the panel **10** turns from the third position shown in **FIG. 6c** into the second position shown in **FIG. 6b**. Then, the motor keeps the guiding device **40** moving inwards, and the guiding device **40** brings the sliders **22** with the linkages **20** to move along the slot **31** until the panel **10** achieves the first position shown in **FIG. 6a**.

[0027] Although the present invention has been described with reference to the preferred embodiment thereof, it is apparent to those skilled in the art that a variety of modifications and changes may be made without departing from the scope of the present invention which is intended to be defined by the appended claims.

What is claimed is:

1. A screen transportation device comprising:

a frame;

a carrier being movable between a first position and a second position;

a linkage having one end pivoted with a first connecting part on the carrier and another end slid along and pivoted with the frame; and

a guiding device pivoted with a second connecting part on the carrier and being movable in the frame;

wherein the carrier is able to pivot with the second connecting part on the carrier between a first angle and a second angle.

2. The screen transportation device as claimed in claim 1, wherein the frame is formed as a case, and has an opening on front side and a space to install the carrier.

3. The screen transportation device as claimed in claim 2, wherein the frame has a guide, and the guide is mechanically connected with the linkage.

4. The screen transportation device as claimed in claim 3, wherein the guiding device is slid inside of the frame and movable backward from and forward to the opening.

5. The screen transportation device as claimed in claim 4, wherein the guiding device is driven with an actuator to move among the first position where the carrier is wholly inserted in the frame, the second position where the carrier is moving out of the frame, and a third position where the carrier arrives at the second angle.

6. The screen transportation device as claimed in claim 5, wherein the actuator comprises a motor.

7. The screen transportation device as claimed in claim 6, wherein the carrier comprises a liquid crystal display.

8. The screen transportation device as claimed in claim 7, wherein the guide is formed as a slot.

9. The screen transportation device as claimed in claim 7, wherein the guide is formed as a slot, and the linkage is pivot on a slider that is slid in the slot.

10. A screen transportation device comprising:

a case having an opening on a front side, a slot, and a space;

a carrier installed in the case;

a linkage having one end pivoted with a first connecting part on the carrier, and another end mechanically connected with the slot and slid along the slot a required distance; and

a guiding device pivoted with a second connecting part on the carrier and being movable in the case a required distance;

wherein the sliding stroke of the guiding device is longer than the longitudinal distance of the slot, and the guiding device, the linkage, and the carrier move along in a same direction.

11. The screen transportation device as claimed in claim 10, wherein the guiding device is driven with an actuator to move among a first position where the carrier is wholly inserted in the frame, a second position where the carrier is moving out of the frame, and a third position where the carrier arrives at the second angle.

12. The screen transportation device as claimed in claim 11, wherein the carrier comprising a controller that can command the actuator so that the carrier moves among the first position, the second position, and the third position.

13. The screen transportation device as claimed in claim 12, wherein the actuator comprises a motor.

14. The screen transportation device as claimed in claim 13, wherein the carrier comprises a liquid crystal display.

15. The screen transportation device as claimed in claim 14, wherein the linkage is pivot on a slider that is slid in the slot.

16. A screen transportation device comprising:

a case having an opening on a front side, a slot, and a slider being movable with a specific stroke in the slot;

a carrier installed in the case;

a linkage having one end pivoted with a first connecting part on the carrier, and another end mechanically connected with the slider slid along the slot; and

a guiding device pivoted with a second connecting part on the carrier and being movable with a specific stroke in the case;

wherein the sliding stroke of the guiding device is longer than the slider, and the guiding device, the slider, and the carrier move in a same direction.

17. The screen transportation device as claimed in claim 16, wherein the guiding device is driven with an actuator to move among a first position where the carrier is wholly inserted in the frame, a second position where the carrier is moving out of the frame, and a third position where the carrier arrives at the second angle.

18. The screen transportation device as claimed in claim 17, wherein the carrier comprising a controller that can command the actuator so that the carrier moves among the first position, the second position, and the third position.

19. The screen transportation device as claimed in claim 18, wherein the actuator comprises a motor.

20. The screen transportation device as claimed in claim 19, wherein the carrier comprises a liquid crystal display.

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