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(54) Flat screen ejection and retraction device

(57) It comprises a housing (1) with an opening at one of its sides, guide means (3) for linearly guiding the movements of a flat screen (4) in relation to said housing (1) and through said opening, and activating means (5) for activating said movements in a direction inwards the housing (1), as far as a safe storage position, and in a direction outwards the housing (1), as far as a working position. Furthermore it comprises connecting means for connecting, in a moving way, the housing (1) to a support (6) in order to vary the flat screen (4) inclination in relation to said support (6) for adapting a viewing angle in said working position.

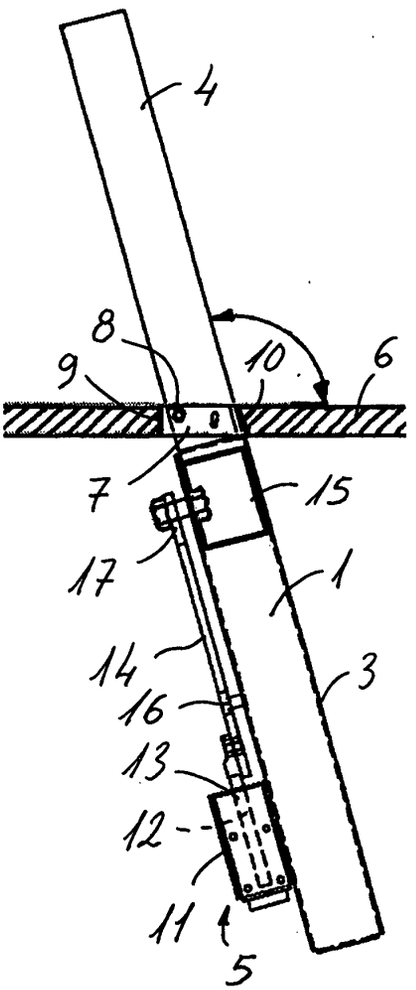

Fig.4

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Description

Technical field

[0001] This invention in general refers to an ejecting and retracting device for a flat screen and, namely to a linear ejecting and retracting device for a flat screen which comprises means for varying the slope of the flat screen in order to bring the vision angle in line.

Prior art

[0002] In the prior art several devices are known which include a housing which may house a screen, such as, for example, a computer monitor, and means for ejecting the said screen from inside the housing up to a working position and to retract the said screen from the said working position up to a safe storage position within the housing.

[0003] The patent FR-A-2744892 shows a desk in which a part of the working board is opened sliding sidewards and discloses an extracting system which uprightly ejects a computer concealed under the board until that moment. This is achieved by simply pressing a button. To close it, by newly pressing the button, the computer is newly lowered within the desk and the board moving part slides towards the opening of the extracting system until recovering its closed position. The extracting system uses a scissors mechanism driven by an electric motor and a driving gear.

[0004] The patent WO 98/26585 discloses a screen for displaying video images in which the screen is coupled rotating on a bottom unit, being able to rotate between a folded position with respect to the bottom and an open position with respect to the bottom. Driving means monitored by control means allow to rotate the screen and to locate it at any intermediate position chosen among the said folded and open position to enhance a correct vision.

[0005] The patent US-A-579766 discloses a desk having a top opening and a housing located under the said opening. A suitable structure to contain a monitor is mounted moving, linearly guided in the said housing and a pantograph mechanism driven by an electric motor and a nut and spindle drive is arranged to move the said structure from a safe storage position, concealed under the board of the desk and a visible working position on the desk board.

[0006] The application for a patent US N° 2002/0101139 discloses a lifting device for a flat screen comprising a housing with an opening on one of its sides, guiding means for linearly guiding travels of the said flat screen with respect to the said housing and through the said opening and driving means to control the said travels in a direction inwards the housing up to a safe storage position, and in a direction outwards the housing, up to a working position.

[0007] There exists the need to have available an ejecting and retracting device for a flat screen which matches ejecting and retracting linear travels of the screen with swivelling motions which allow to change the slope of the flat screen with relation to a support thereof to bring the vision angle in line.

[0008] None of above documents disclose a device having the said characteristics.

Explanation of the invention

[0009] This invention contributes to fill above requirement by providing an ejection and retraction device for a flat screen including a housing which has an opening on one of its sides, guiding means for linearly guiding the travels of the said screen with respect to the said housing and through the said opening and driving means for controlling the said travels in a direction inwards the housing up to a safe storage position and in a direction outwards the housing up to a working position. The device of this invention is characterised in that it comprises linking means to movingly link the housing to a support in order to change the slope of the flat screen with relation to the said support to bring the vision angle in line.

[0010] According to an example of embodiment, the said linking means comprise a bottom element adapted to be fixed on the said support and gudgeons arranged on opposite sides of the housing and swivel linked to the said bottom element, the said gudgeons being close to the opening of the housing and aligned with each other so that they define a swivelling axis parallel to the flat screen. The said linking means are adapted to allow a hand drive of the housing rotation and therefore, the screen rotation, with respect to the said gudgeons, although electromechanical or hydrodynamic driving means could be incorporated for carry out such rotations. The said bottom element comprises stops to limit the housing rotation angle with respect to the bottom element and, preferably, the device includes means for locking the set of housing and screen in a chosen angular position.

Short description of the drawings

[0011] Above and other characteristics and advantages will be more apparent from the following detailed description of an example of embodiment with reference to the drawings appended in which:

Fig. 1 is a diagrammatic front elevation view of the device according to an example of embodiment of this invention with the screen in a safe storage position;

Fig. 2 is a diagrammatic front elevation view of the device of Fig. 1 with the screen in a working position;

Fig. 3 is a diagrammatic side elevation view of the device of Fig. 1 with the screen in a working position

perpendicular to the support; and

Fig. 4 is a diagrammatic side elevation view of the device of Fig. 1 with the screen at an inclined working position with respect to the support.

Detailed description of an example of embodiment

[0012] Referring now to the figures, with numeral 20, an ejecting and retracting device for a flat screen is shown according to this invention. The device comprises a housing 1 which has an opening 2 on one of its sides: within the housing 1 guiding means are arranged to linearly guide travels of a guided support 15 with respect to the housing 1 and through the said opening 2. The flat screen 4 is fastened on the said support 15, and driving means 5 are coupled to drive the support 15 travels in order to carry out the ejection and retraction of the flat screen 4 through the opening 2. An ejection travel goes from a safe storage position , shown in Fig. 1, in which the screen 4 is located completely within the housing 1, outwards up to a working position, shown in Fig. 2, in which at least the part of the screen display is completely out of the housing 1, A retraction travel goes from the working position, shown in Fig. 2, in an inwards direction up to the safe storage position, shown in Fig. 1.

[0013] The device of this invention comprises linking means to movingly link the housing 1 to a support 6. The said capability to move the support 1 provides the possibility to change the slope of the flat screen 4 with relation to the said support 6 to bring a vision angle in line at the said working position.

[0014] As shown in Fig. 3 and 4, the said linking means comprise a bottom element 7 adapted to be fastened on the said support 6 and gudgeons 8 fastened on the housing 1 and linked swivelling on the said bottom element 7. The said gudgeons 8 are arranged on opposite sides of the housing 1, close to the opening 2 and aligned with each other so that they define a swivelling axis preferably parallel to the flat screen 4 and eventually also parallel to the support 6. This arrangement of the linking means is adapted to allow a hand drive of the housing 1 rotation with respect to the said gudgeons 8. Advantageously, the device includes means for locking the set of housing 1 and screen 4 at a chosen angular position, so that the ejection and retraction travels are carried out in the said chosen angular position. However, the device of the invention could easily incorporate an electromechanical or hydrodynamic driving means to carry out the said orientation rotations, so that the angular position of the screen could be more easily changed and, in addition, more frequently.

[0015] The bottom element 7 comprises at leas a first and a second stops 9, 10 to limit the angle the housing 1 is capable to rotate with respect to the bottom element 7. The said rotation angle comprised between the limits established by the first and second stops is, in general 5 to 25 degrees and preferably of approximately 15 degrees as it is considered sufficient to comprise a suitable vision angle at the said working position. Preferably, the first stop 9 defines a position of the screen 4 significantly perpendicular to the bottom element 7 and the second stop 10 defines a position of the screen 4 inclined towards the part opposite to the displaying part of the screen.

[0016] In an example of embodiment illustrated, the opening 2 is on the top side of the housing 1, which is linked to a support 6, such as the board of a desk or counter, concealing the housing 1 at the lower part thereof, in this case, the outwards direction of the travel for ejecting it out of the housing 1 is upwards. However, the device can also be installed in the opposite way, so that the said support 6 is the facing of a ceiling or soffit (not shown) and the housing 1 is arranged above it, in which case the outwards direction of the housing 1 would be downwards.

[0017] Again referring to Fig. 1 and 2, the said driving means 5 comprise an electric motor 11 coupled to rotate a spindle 12 geared with a nut 13 connected to a first end of the lever arm 14 linked by a second end to the said guided support 15, to which the flat screen 4 is fastened. The said lever arm 14 comprises, at an intermediate area, an hinged joint 16 with respect to the housing 1, so that a travel to or from the first end of the lever arm 14 with respect to the motor 11 produces increased travels of the second end of the lever arm 14 and thanks to a hinged and sliding connection 17, of the said second end with the guided support 15, the screen 4 fastened on the guided support 15 sustains the said ejection and retraction travels.

[0018] Alternatively, according to examples of embodiment not shown, the driving means 5 can comprise, for example, an electric motor adapted to rotate a dragging pulley having a geared belt arranged to move the guided support 15 to which the flat screen 4 is fastened , or a scissors mechanism or pantograph driven by an electric motor or a threaded column driven in rotation by an electric motor. Alternatively, some of these mechanisms can be driven by a hydrodynamic actuator.

[0019] Anyway, the device preferably includes a control circuit and, according to an example of embodiment, at least a button or key connected to the said control circuit to trigger the electric motor 11 in order to start an ejection travel if the screen 4 is at the safe storage position, or a retraction travel , if the screen 4 is at the working position, and end of stroke detectors are suitably arranged to stop the electric motor 11 when the screen 4 reaches the working position or the safe storage position, respectively. According to another example of embodiment, the device comprises a remote control to trigger the said electric motor 11 while the said end of stroke detectors acts in a similar way to stop the driving electric motor 11. The option of the said remote control results very suitable when the device is installed at a place having a difficult access, such as a ceiling or a soffit.

[0020] Above examples of embodiment are only for

illustration and not limitation purpose of the scope of this invention, which is defined in the claims appended.

Claims

1. Ejection and retraction device for a flat screen, of the type comprising a housing (1) which has an opening (2) on one of its sides, guiding means (3) to linearly guide travels of the said flat screen (4) with respect to the said housing (1) and through the said opening (2), and driving means (5) to drive the said travels in a direction inwards the housing (1), to a safe storage position and in a direction outwards the housing (1), to a working position, **characterised in that** it comprises linking means for movingly linking the housing (1) to a support (6) in order to change the slope of the flat screen (4) with relation to the said support (6) to bring a vision angle in line with the said working position.

2. Device, according to claim 1, **characterised in that** the said linking means comprise a bottom element (7) adapted to be fastened on the said support (6) and gudgeons (8) arranged on opposite sides of the housing (1) and linked swivelling on the said bottom element (7).

3. Device, according to claim 3, **characterised in that** the said gudgeons (8) are close to the opening (2) and aligned to each other defining a swivelling axis parallel to the flat screen (4).

4. Device, according to claim 3, **characterised in that** the said bottom element (7) comprises at least a first and a second stops (9, 10) to limit the housing (1) rotation angle with respect to the bottom element (7).

5. Device, according to claim 4, **characterised in that** the said rotation angle is 5 to 26 degrees between a position significantly perpendicular to the bottom element (7) defined by the first stop (9) and an inclined position defined by the second stop (10).

6. Device, according to claim 2, **characterised in that** the said linking means are adapted to allow a hand drive of the housing (1) rotation with respect to the said gudgeons (8).

7. Device, according to the claim 1, **characterised in that** the said driving means (5) comprise an electric motor (11), coupled to rotate a spindle (12) and nut (13) mechanism connected to a first end of a lever arm (14) linked by a second end to a guided support (15) to which the flat screen (4) is fastened, the said lever arm (14) comprising at its intermediate area a hinged joint (16) with respect to the housing (1).

8. Device, according to claim 1, **characterised in that** the said driving means (5) comprise an electric motor adapted to rotate a dragging pulley of a geared belt arranged to move a guided support (15) to which the flat screen(4) is fastened.

9. Device, according to claim 7 or 8, **characterised in that** it comprises at least a button or key to trigger the said electric motor (11) and end of stroke detectors to stop the electric motor (11).

10. Device, according to claim 7 or 8, **characterised in that** it comprises at least a remote control to trigger the said electric motor (11) and end of stroke detectors to detect the electric motor (11).

11. Device, according to claim 1, **characterised in that** the said support (6) is a board of a desk or counter, and the said direction outwards the housing (1) is upwards.

12. Device, according to claim 1, **characterised in that** the said support (6) is the facing of a ceiling or soffit, and the said outwards direction (1) is downwards.

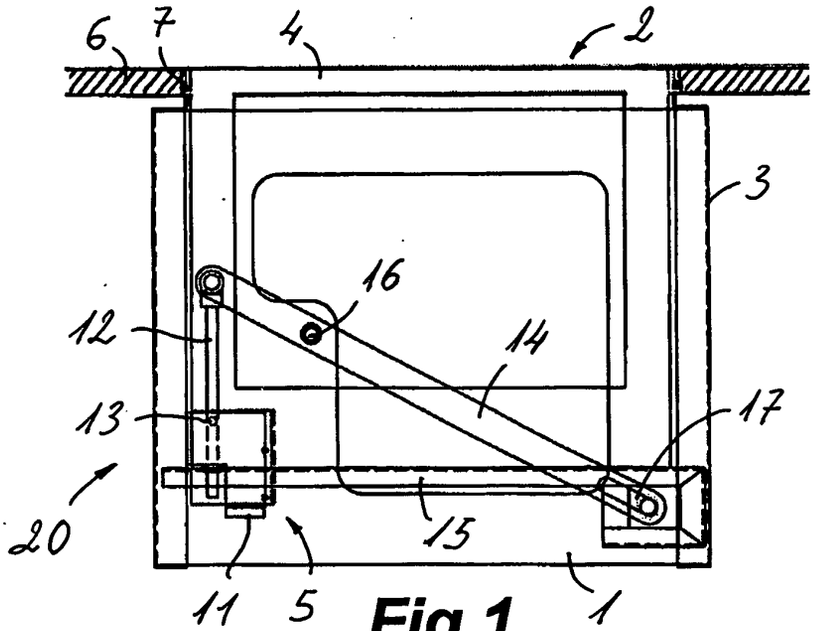

Fig.1

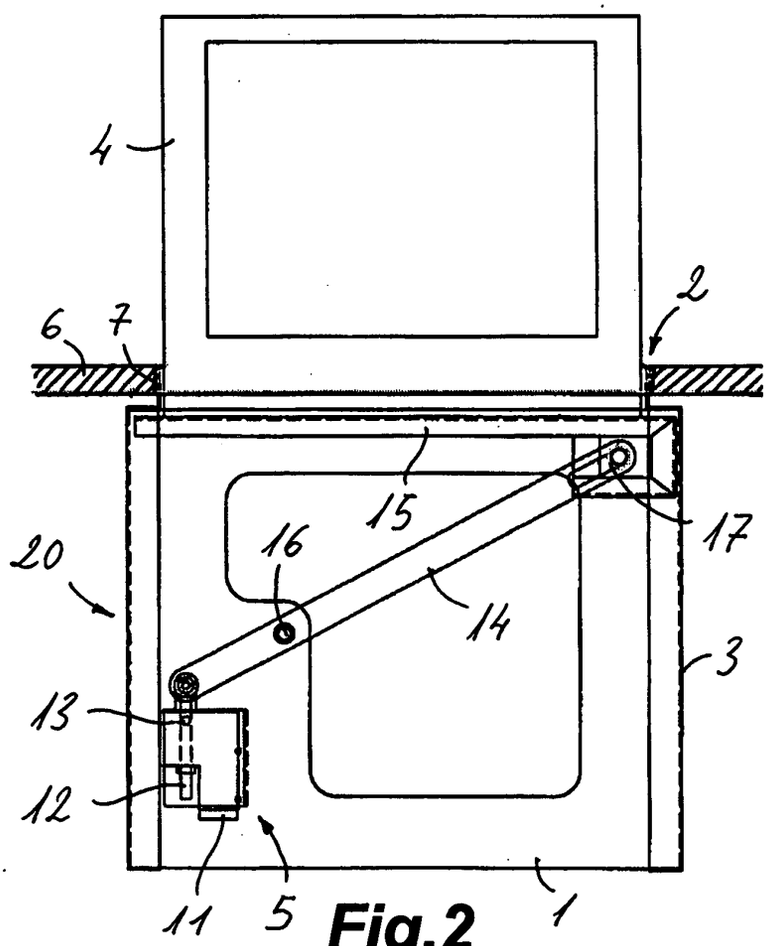

Fig.2

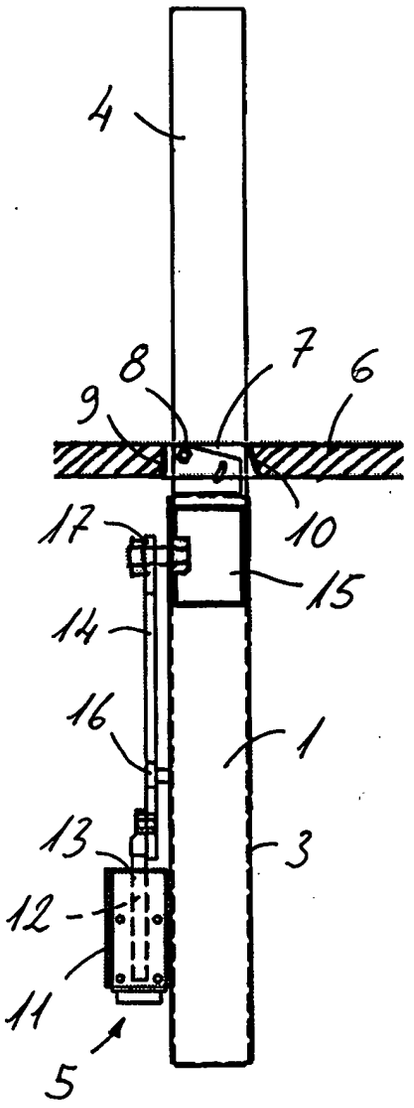

Fig.3

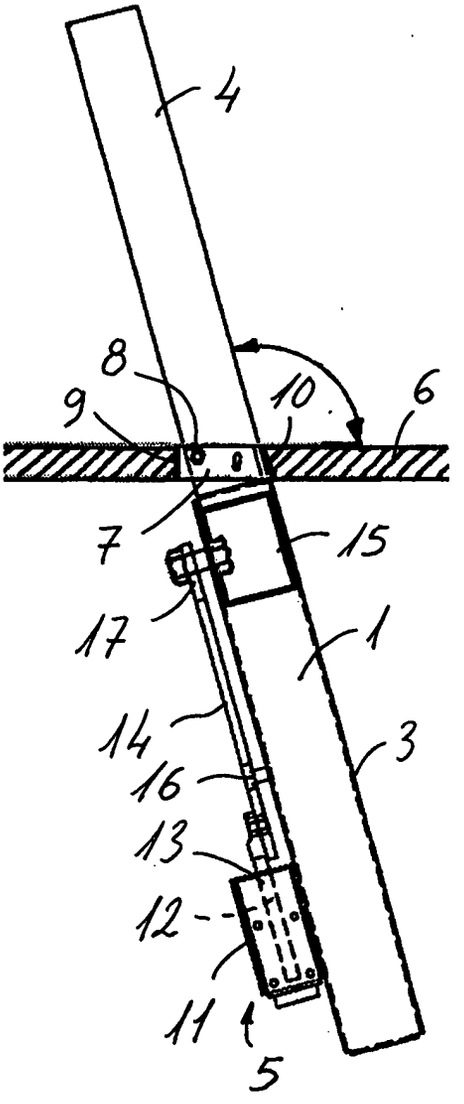

Fig.4

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EUROPEAN SEARCH REPORT

Application Number
EP 05 38 0021

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 5 401 089 A (YAMAHA) 28 March 1995 (1995-03-28) * the whole document * -----	1-12	A47B21/00
X	WO 01/95763 A (TNCI UK TLTD) 20 December 2001 (2001-12-20) * the whole document * -----	1-12	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A47B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	27 May 2005	Noesen, R

CATEGORY OF CITED DOCUMENTS

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27-05-2005

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