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(56) Documents Cited

EP 0394879 A1 US 5544005 A US 4903221 A

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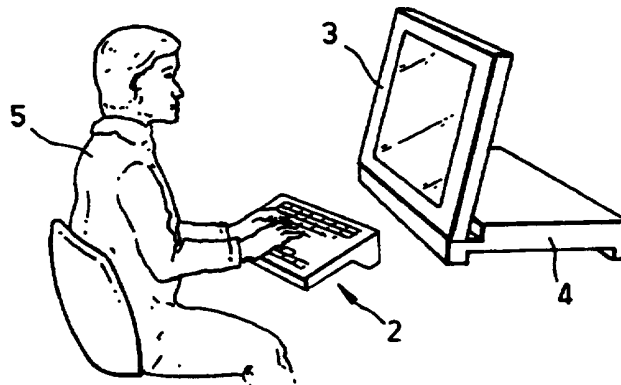
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(54) Abstract Title

Positioning notebook computer screen to facilitate use with external keyboard

(57) When using an external keyboard with a notebook computer, the integral keyboard prevents the screen from being located at the optimum distance from the user. So that the external keyboard can be placed nearer to the notebook's screen, said screen may be capable of rotating through 270° about its hinge from the closed position, allowing the notebook to be placed with its integral keyboard face down on a work surface thereby permitting location of the external keyboard nearer the screen. Alternatively, with the screen open to an angle of 270° the notebook can be stood on its ends in an "A" shaped configuration. In this mode the screen display needs inverting. In a further mode the screen is detachable and may be relocated at the end of the integral keyboard which is nearest the user. Alternatively, the screen can rotate about an axis perpendicular to its hinge.

Fig.2.



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Fig.1.

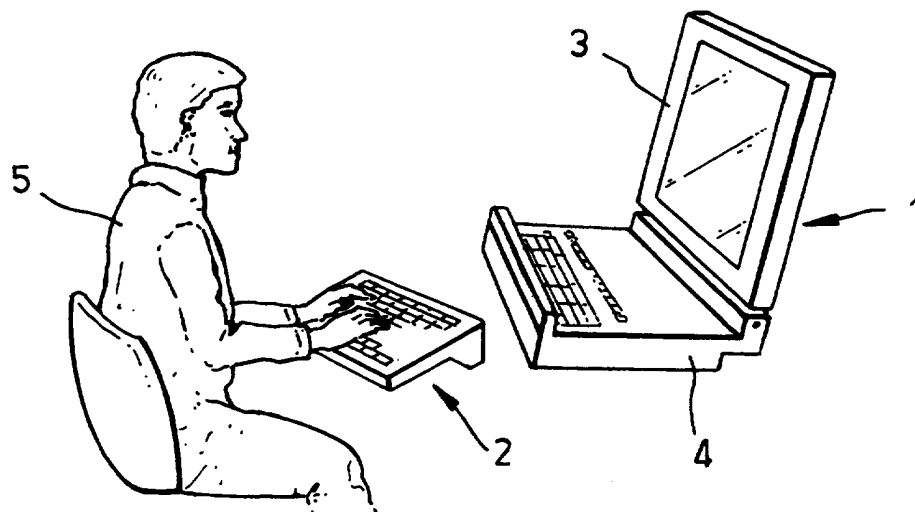


Fig.2.

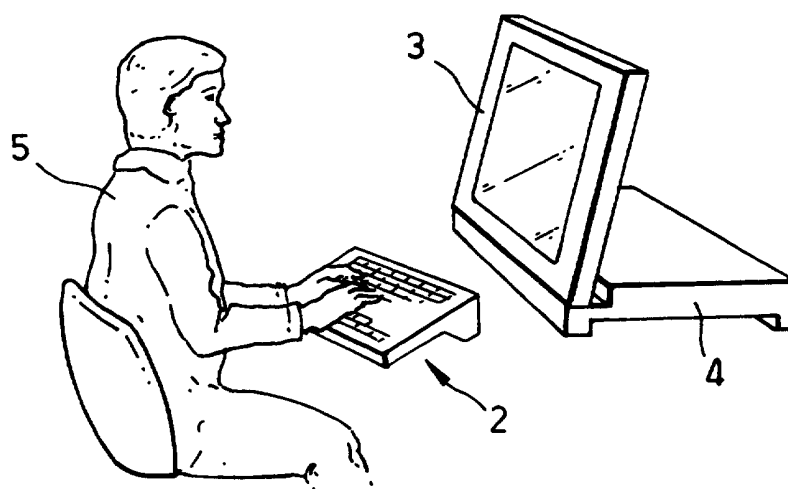


Fig.3.

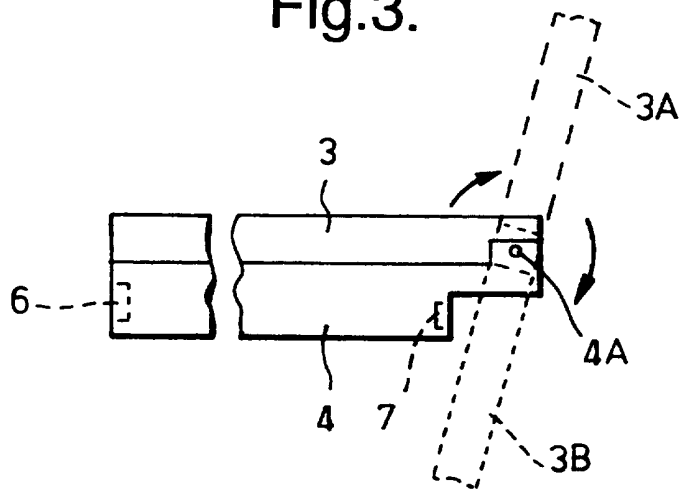


Fig.4.

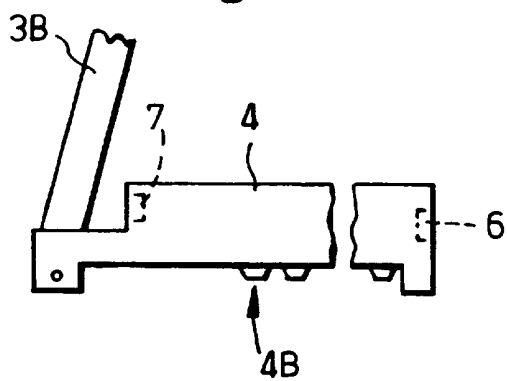


Fig.4A.

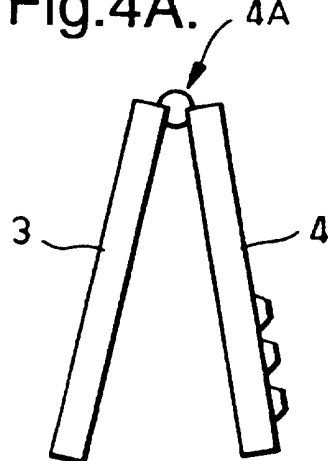
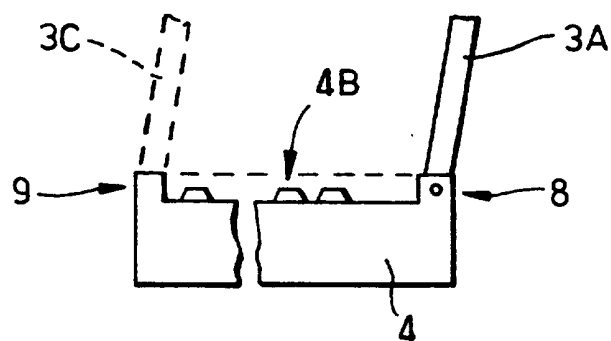


Fig.5.



NOTEBOOK COMPUTERS

This invention relates to notebook computers and in particular to notebook computers which, in addition to being usable in the portable, or free-standing, mode, facilitate use in a primary workstation arrangement at a workplace.

The technological advances in notebook screen technology, in particular the increased screen sizes which have become possible, mean that a notebook's own screen can be used as a primary display at a workstation, instead of for example a CRT monitor or another form of substantially non-portable display. However, the keyboard and mouse solutions of the notebook do not meet the current requirements for primary workstation input devices. When a notebook screen is used in a primary workstation context, external input devices must be used. Thus for example, the notebook computer is opened up in order to be able to view its screen and a separate primary workstation keyboard is employed as illustrated schematically in Figure 1. The keyboard may be connected to the notebook and/or other elements comprising the primary workstation by, for example, cables, infrared links, or the like. However, when the separate keyboard is disposed in front of the notebook in this manner, the distance between the user and the notebook screen is longer than is desirable for optimum viewing of the screen.

It is an object of the present invention to provide a means of achieving the optimum view distance between a notebook screen and a user employing a separate keyboard.

According to one aspect of the present invention there is provided a notebook computer comprising a body portion with a screen portion operatively connected thereto, wherein the screen portion is positionable relative to the body portion

such that it can be used in conjunction with a separate keyboard disposed at a distance from the screen portion corresponding to the optimum viewing distance for a user of the separate keyboard and closer to the screen portion than the depth of the body portion.

According to another aspect of the present invention there is provided a notebook computer comprising a body portion with a screen portion operatively connected thereto, wherein the screen portion is pivotable between a first position in which the notebook computer is closed, a second position in which the screen portion has been rotated through an angle of the order of 90° relative to the first position, and a third position in which the screen has been rotated through an angle of the order of 270° relative to the first position.

According to yet another aspect of the present invention there is provided a notebook computer comprising a body portion with a screen portion operatively connected thereto, wherein the screen is disconnectibly mounted to a back edge of the body portion and pivotable thereat between a first position in which the notebook computer is closed and a second position in which the screen has been rotated through an angle of the order of 90° relative to the first position, and wherein the screen is alternatively mountable to a front edge of the body portion in an orientation such that it extends substantially parallel to the second position.

Embodiments of the invention will now be described with reference to the accompanying drawings, in which:

Figure 1 illustrates, schematically a conventional notebook computer being used in combination with a separate keyboard;

Figure 2 illustrates schematically a notebook computer according to one embodiment of the present invention being used in combination with a separate keyboard;

Figure 3 illustrates highly schematically and not to scale a partial end view of a notebook computer according to the one embodiment of the present invention with the screen in the closed position; the normal (portable) open position (dashed lines) and the fully open position (dotted lines);

Figure 4 illustrates the notebook of Figure 3 with the screen in the fully open position and orientated for use (integral keyboard facing downwards) with an external keyboard;

Figure 4A illustrates another possible arrangement of the notebook of Figure 3, and

Figure 5 illustrates highly schematically and not to scale an end view of another embodiment of the invention in which the screen is normally hinged to the back of the computer body but is movable from that position to an alternative position (dashed lines) at the front of the computer body for use with an external keyboard.

Referring firstly to Figure 1, which illustrates a conventional notebook computer 1 being used with a primary workstation keyboard 2, the screen 3 of the notebook computer 1 is being used as the primary workstation display. In this set-up, the body 4 of the notebook computer can prevent the keyboard 2 being positioned close enough to the screen so that the user 5 is at the optimum viewing distance from the screen. The screen 3 is hinged to the back edge of body 4 in such a manner that when the notebook computer is opened for use there is an angle between them that will be referred to as of the order of 90°, although in practice it can be somewhat greater and will be such as to provide an optimum view of the screen.

In order to enable the keyboard 2 to be positioned closer to the screen 3 than previously possible, that is closer to the screen than the distance between the front and back edges of

the body ie its depth, it is proposed to arrange that the relative positions of the screen 3 and the body 4 of the notebook computer be changeable. One possible means of achieving this is to provide a hinge arrangement between the screen 3 and the body 4 at the back edge thereof that enables the notebook computer to be opened to such an extent that there is an angle between them which will be referred to as of the order of 270° , although in practice it can be somewhat greater in order to provide an optimum view of the screen. Such an arrangement is illustrated in Figure 2, in which the notebook computer has been opened up to the order of 270° and the body has been positioned on a work top with the integral keyboard facing downwards. Figure 3 illustrates very schematically, in order to indicate the principle, a partial end view of a notebook computer having a screen able to pivot about an axis 4A and open to such an extent, and indicating the closed position of the screen 3 relative to the body 4 in a solid line, the normal of the order of 90° viewing position of the screen in a dashed line 3A, and the order of 270° viewing position of the screen in a dotted line 3B. To enable the screen to be viewed with the image the right way up in the order of 270° orientation the body 4 must be disposed with the integral keyboard 4B downwards, as indicated in Figure 4.

In the order of 270° orientation illustrated in Figure 3 the image on the screen is the wrong way up when the body is disposed with the integral keyboard uppermost. If the image could be reversed (top to bottom) this order of 270° orientation could also be employed by, for example, disposing the body 4 at a higher level than the keyboard 2, for example, on some form of shelf, and with the integral keyboard uppermost. In such a case the orientation would be somewhat less than 270° for optimum viewing. Such an arrangement might be preferable in certain circumstances, particularly in connection with CD Roms or floppy disks, the drives for which may not operate in an upside down

configuration, as well as possibly being difficult to use when upside down. Instead of disposing the body on a shelf and angling the screen as appropriate, the opened out notebook computer could just be stood up as illustrated schematically in Figure 4A, in which the angle will be greater than 270° and the image will need reversing, top to bottom. Locking means could be provided to ensure that this angle is maintained.

In the arrangements illustrated in Figures 2, 3 and 4, a docking connection 6 can be disposed at the front of the body 4 in order to be accessible when the order of 270° orientation is employed (Figure 4), the docking connection being required when the screen is to be used as a primary workstation display. Connections 7 which are required when the notebook computer is to be used in the normal order of 90° orientation can be disposed at the back of the body as illustrated, these include parallel and serial ports. Locking means (not shown) are preferably provided in order to lock the screen into the desired orientation (90 or 270°).

An alternative possibility which permits the screen 3 and external keyboard 2 to be positioned closer together, and with the body the right way up, is to arrange that the screen 3 and body 4 are operatively connectible to one another both at the front and back edges of the body 4, as illustrated in Figure 5. At the back of the body is a hinge arrangement 8 permitting the screen to be closed down onto the keyboard 4B (as indicated by the dotted line) and disposed at the order of 90° orientation 3A (solid lines), and also to be disconnected therefrom, whereas at the front of the body there is an alternative hinge or other connection arrangement 9 permitting the screen to be operatively connected thereat and disposed in an orientation 3C equivalent to the order of 270° orientation referred to above, but which is actually an order of 90° orientation and parallel to orientation 3A, but which will be closer to the external keyboard, as indicated

by the dotted lines. In this arrangement the docking and other connections will not be covered by the screen in any orientation thereof and can thus be disposed in positions determined by other criteria.

A variant of the Figure 5 arrangement is as follows. As will be appreciated, such as from Figure 1, the screen portion 3 can be attached to the body portion 4 by means of two hinge arrangements. The screen portion is disconnectibly mounted to the back edge of the body portion, but instead of the alternative mounting position being at the front edge of the portion as in Figure 5, in a variant the alternative mounting position is also at the back edge, but with the left and right hinge connection positions interchanged, so that the picture side of the screen portion is then at the back, ie when regarding Figure 5 the image on the screen portion (in position 3A) is viewed from the right, rather than the left. If the wire connection between the screen and body portions is, say, in the middle of the bottom side of the screen, it need not be disconnected, rather "twisted" through 180°. If the wire connection is through one hinge and both hinge and wire are pivotable through 180°, the other hinge being disconnectible, the screen portion can readily be turned around. A separate support for the other hinge can be provided for such a variant. Alternatively, there can be a single hinge which is centrally disposed at the bottom side of the screen portion and with the wire connection extending through it, the whole hinge/wire arrangement being pivotable through 180° to present the image on the opposite side of the screen portion to the usual notebook configuration.

The arrangements proposed by the invention thus permit the screen of a notebook computer to be used as a primary workstation display, saving the cost of purchasing a CRT monitor or other display for the workstation, whilst allowing an external keyboard to be positioned close enough to the screen for optimum viewing thereof by a keyboard user.

CLAIMS

1. A notebook computer comprising a body portion with a screen portion operatively connected thereto, wherein the screen portion is positionable relative to the body portion such that it can be used in conjunction with a separate keyboard disposed at a distance from the screen portion corresponding to the optimum viewing distance for a user of the separate keyboard and closer to the screen portion than the depth of the body portion.
2. A notebook computer as claimed in Claim 1, wherein the screen portion is pivotable between a first position in which the notebook computer is closed, a second position in which the screen portion has been rotated through an angle of the order of 90° relative to the first position, and a third position in which the screen portion has been rotated through an angle of the order of 270° relative to the first position.
3. A notebook computer as claimed in Claim 2, wherein the screen portion is pivotably connected to a back edge of the body portion, wherein a docking connection is disposed at a front edge of the body portion, the depth of the body portion corresponding to the distance between the front and back edges of the body portion, and wherein in use with the external keyboard the screen portion is disposed in the third position.
4. A notebook computer as claimed in Claim 3, and wherein in use the body portion is disposed upside down on a work surface.
5. A notebook computer is claimed in Claim 3, including means for reversing the image top-to-bottom on the screen.

6. A notebook computer as claimed in Claim 1, wherein the screen portion is disconnectively mounted to a back edge of the body portion and pivotable thereat between a first position in which the notebook computer is closed and a second position in which the screen portion has been rotated through an angle of the order of 90° relative to the first position, and wherein the screen portion is alternatively mountable to a front edge of the body portion in an orientation such that it extends substantially parallel to the second position, the depth of the body portion corresponding to the distance between the front and back edges.
7. A notebook computer comprising a body portion with a screen portion operatively connected thereto, wherein the screen portion is pivotable between a first position in which the notebook computer is closed, a second position in which the screen portion has been rotated through an angle of the order of 90° relative to the first position, and a third position in which the screen has been rotated through an angle of the order of 270° relative to the first position.
8. A notebook computer comprising a body portion with a screen portion operatively connected thereto, wherein the screen is disconnectively mounted to a back edge of the body portion and pivotable thereat between a first position in which the notebook computer is closed and a second position in which the screen has been rotated through an angle of the order of 90° relative to the first position, and wherein the screen is alternatively mountable to a front edge of the body portion in an orientation such that it extends substantially parallel to the second position.
9. A notebook computer substantially as herein described with reference to and as illustrated in any one of Figures 2 to 5 of the accompanying drawings.



Application No: GB 9702544.9
Claims searched: All

Examiner: Matthew Gillard
Date of search: 13 April 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): G4A ADT

Int Cl (Ed.6): G06F 1/16

Other: On-line: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	EP 0394879 A1 (SANYO). See figs 3, 4 & 11.	1 at least
X	US 5544005 (I. B. M.). See fig 1.	1 at least
X	US 4903221 (ZENITH). See fig 1.	1 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.