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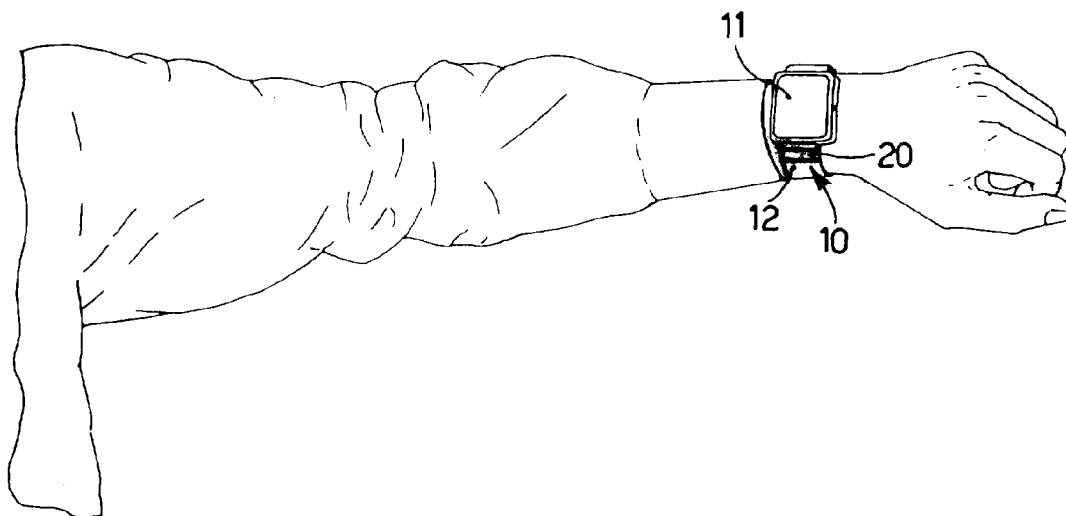
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(54) Title: SUPPORT ELEMENT FOR A PORTABLE ELECTRONIC APPARATUS



(57) Abstract: Support element (10) for a portable electronic apparatus (11), which allows the user to wear the electronic apparatus (11). The support element (10) comprises at least a housing seating (16, 16a and 16b; 17, 17a and 17b) made substantially inside the thickness of the support element (10) in order to contain at least an electric feed mean (19, 19a and 19b; 20, 20a and 20b), and electric connection means (21, 22) which connect the electric feed mean (19, 19a and 19b; 20, 20a and 20b) with the electronic apparatus (11).

WO 2007/039506 A1

- 1 -

"SUPPORT ELEMENT FOR A PORTABLE ELECTRONIC APPARATUS"

* * * * *

FIELD OF THE INVENTION

The present invention concerns a support element, such as
5 for example a bracelet, strap, belt or similar attachment
element, which allows the user to wear, for example on the
wrist, waist, ankle, etc., a portable electronic apparatus,
such as for example an electronic processor, or similar
device.

10 BACKGROUND OF THE INVENTION

Portable electronic apparatuses are known, such as wrist
processors, known by the English term "wearable", such as
Personal Assistants (PA), Personal Enhancement (PE), smart
viewers for night sight, or others, which assist the user
15 in performing a variety of operations, or which supply the
user with an increase in his/her perceptive or active
capacities.

This type of portable electronic apparatus must, for the
normal functional requirements of transportability and
20 practical use, have characteristics of limited size,
limited weight, comfort when worn, and extended feed
autonomy, under normal conditions of use.

To guarantee this extended feed autonomy, batteries are
usually used, or packs of batteries, fixed or removable,
25 which are different in chemistry, shape and type of
installation on the apparatus.

Some examples of feed batteries commonly used for this
type of portable electronic apparatus are:

- a plurality of parallel batteries integrated into the
30 electronic apparatus, of which only one at a time is
connected to the apparatus, that is, once the first
battery is flat the apparatus is automatically fed by a
second battery and so on;

- 2 -

- a single rechargeable and non-removable LiIon or Li-Polymer battery (or pack of two batteries);
- a rechargeable and removable LiIon battery (or pack of batteries);
- 5 - a buffer battery plus a rechargeable and removable LiIon battery;
- a buffer battery plus a pack of rechargeable LiIon batteries;
- a non-rechargeable cylindrical battery; or
- 10 - a series of non-rechargeable cylindrical batteries.

These types of feed batteries that can be associated with the electronic apparatus can be, according to a first known solution, housed directly inside the apparatus. This first solution, however, basically entails an increase in the weight and bulk of the electronic apparatus, which is thus
15 uncomfortable and not functional for the user.

In practice, in fact, the use of a battery pack, removable, rechargeable and integrated into the apparatus itself, requires a consistent increase in the size of the device, which thus becomes less wearable, less versatile
20 and less ergonomic. On the contrary, using a buffer battery and a series of identical rechargeable batteries (or battery packs), removable and with limited capacity, it is necessary to provide a mechanism to house the batteries, which considerably increases the size and weight of the
25 apparatus.

In the solution where rechargeable and non-removable Li-Polymer batteries are used, it is possible to keep the electronic apparatus within acceptable sizes, but with the disadvantage, however, that it has only some hours of
30 autonomy, substantially in any condition of use.

According to another known solution, the feed batteries are disposed in specific external containers that the user

- 3 -

can wear, such as rucksacks, pouches or other containers to be worn above the work clothes, or containers integrated into the clothing (in pockets, compartments, etc.), and connected by means of electric cables to the apparatus.

5 This second solution, however, entails a reduction in the overall ergonomics of the electronic apparatus, and a limitation to the freedom of movement of the user who could even get accidentally entangled in the feed cables.

The US patent US-B-6,375,079 discloses a portable
10 electronic apparatus provided with an electronic pointer wearable on the operator's finger. In this solution, the ring that allows to wear the pointer comprises two inner cores, made of conductor material, and substantially on the whole outer surface a Li-Polymer battery, whose poles are
15 connected to the conductors cores, is applied and shaped, so that the ring itself guarantees the supply of energy to the pointer.

However, the battery is rigid and does not allow any flexion and/or elastic deformation of the ring, so that the
20 ring is rigid and cannot be adapted to the different sizes of the fingers of different users. Furthermore, this solution is not applicable for wearing on the wrist, ankle and even less on the waist of the user, which have very variable sizes from user to user.

25 The US patent application US-A-2003/0222109 concerns a support device provided with a strap and a container, the main function of which is to allow to house objects in general inside it, also including electronic apparatuses. In one embodiment described, inside the container, and not
30 inside the strap, a feed battery is provided, exclusively intended to feed an illuminating light inside the container. In another embodiment described, the support of a personal assistant is provided, or a cellular phone,

- 4 -

having a keyboard, a display and its own feed battery, distinct from the support device.

EP-A-1 286 245 describes a portable computer directly connected with a feed battery to avoid using cables and
5 wires; the battery is disposed in a position where it can be easily replaced or removed. The battery and the computer are both associated with the user's waist by means of a belt.

However, this type of solution needs a particularly bulky
10 structure since the housings and bulks of the reciprocal connection pins between the batteries and the computer must necessarily be provided, and also the mechanism to temporarily retain and remove the batteries.

This necessary over-sizing, however, prevents the system
15 being applied, for example, to a wrist or an ankle, since it is uncomfortable and cumbersome, and can also cause considerable fatigue for users, and the risk of accidental knocks to the apparatuses.

In the German patent application DE-A-100 19 166 a
20 portable electronic apparatus is described which can be worn on the wrist by means of a strap, and in which an electric feed unit is disposed separate from the apparatus and associated externally to the strap by means of an auxiliary container. In this embodiment, the auxiliary
25 container that contains the feed unit protrudes considerably from the strap since it is pre-disposed to contain other electronic members too, such as for example an antenna, a SIM card and an alarm device. Therefore, in this case too, the electronic apparatus is uncomfortable
30 and cumbersome, causing considerable fatigue for users, and the risk of accidental knocks to the apparatuses, with consequent possible breakage and malfunctions thereof.

One purpose of the present invention is to overcome the

- 5 -

disadvantages of the state of the art so that the portable electronic apparatus has great autonomy (in the range of several working hours), at the same time maintaining a minimum impact on wearability, size and ergonomics.

5 Another purpose of the present invention is to allow a level of autonomy of the portable electronic apparatus that can be configured, allowing to choose between several different feed solutions for conditions of use that differ on each occasion.

10 The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

15 The present invention is set forth and characterized in the main claim, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

In accordance with the above purposes, a support element according to the present invention allows the user to wear a portable electronic apparatus, of the so-called wearable type, and comprises at least a housing seating made substantially in its bulk, and inside which a portable electric feed mean is disposed, such as for example a battery, or a battery pack, in order to feed the electronic apparatus electrically. According to the present invention, the support element also comprises electric connection means, such as for example one or more cables, one or more conductor tracks, touch contacts or others, which allow to connect the electric feed mean with the electronic apparatus in order to feed it.

With the present invention we therefore have a complete dislocation of the feed mean from the electronic apparatus

- 6 -

on the support element, without it being necessary to provide cumbersome and uncomfortable auxiliary containers protruding from the bulk of the support element and which, once the user has put them on, can limit his/her freedom of movement.

The support element according to the present invention thus integrates directly inside it the feed means, without compromising the normal wearability and functionality of the support element, for example its elasticity and adaptability to the specific sizes of the user's body, and with no risk that excessively protruding elements can be accidentally knocked, with consequent breakages or malfunctions.

This solution also allows more easily to selectively use a rechargeable feed mean sized in such a manner as to guarantee a desired high level of autonomy.

Advantageously, the feed means are shaped so as to have the side normally disposed transverse to the support element of a greater length with respect to the side normally disposed on the length of the support element.

In this way, the feed means extend in a direction mainly transverse to the support element, occupying only a short longitudinal segment of the latter. Thanks to this, maximum flexibility of the support element is guaranteed and therefore its adaptability substantially to every morphology of the part of the body with which it is associated.

Moreover, with the present invention, by disposing the electric feed mean directly on the support element, it is possible to improve the distribution of the weight of the support element, and the characteristics of symmetrical distribution of the weight of the entire system on the user's arm, which otherwise would not be possible.

- 7 -

A further advantage given by integrating the feed mean on the support element is that the shape, size and ergonomics of the electronic apparatus can be optimized, since there is no mechanical constraint due to the need to integrate the feed mean inside said electronic apparatus.

With the present invention an optimum versatility of applications is also guaranteed, both to different parts of the user's body, for example waist, wrist, ankle or other, and also different morphologies of the users, without compromising the normal gripping functions of the support element, the duration of feed of the feed means, and comfort.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 shows a support element according to the present invention with a relative electronic apparatus worn on the wrist of a user;
- fig. 2 is a schematic view from above of a first form of embodiment of the support element in fig. 1;
- fig. 3 is a schematic view of a second form of embodiment of the support element in fig. 1.

DETAILED DESCRIPTION OF A PREFERENTIAL EMBODIMENT

With reference to the attached drawings, a support element according to the present invention, in this case a bracelet 10, is associated with a portable electronic apparatus 11 (wearable), so as to allow the user to wear the latter on his/her wrist while he/she is carrying out a working activity that requires the use of said portable apparatus 11.

It cannot be excluded that the support element according

- 8 -

to the invention can consist, in other, equivalent embodiments that are not shown here, of a belt, an ankle-strap or other.

Purely to give a non-restrictive example, the portable
5 electronic apparatus 11 is in this case a wrist processor, commonly known in English as "wearable", which assists the user in performing a variety of operations. In any case, the type of portable electronic apparatus 11 associated with the bracelet 10 lies beyond the present invention.

10 With reference to figs. 1 and 2, the bracelet 10 consists substantially of a band 12 of elasticized fabric with, purely to give a non-restrictive example, a total size of about 130x85 mm. It is obvious that the band 12 could be smaller or larger depending on various factors, such as for
15 example the sizes of the various components of the portable electronic apparatus 11. The band 12 is closed around the user's wrist using a through buckle 13 and two strips of Velcro® 15 disposed on opposite ends and surfaces of the band 12, so as to be able to effect a precise regulation
20 around the wrist according to the size of the latter.

According to a characteristic feature of the present invention, the band 12 is provided with two housing pockets 16 and 17, made substantially inside the thickness thereof and in any case such as not to entail substantial
25 modifications to the bulk of the cross section of the band 12, and of a size such that inside each of them a respective feed battery 19, 20 is housed.

Each feed battery 19, 20 in this case is of the Li-Polymer rechargeable prismatic accumulator type.

30 In the same way as for the band 12, the sizes of the batteries 19 and 20 are supplied purely to give an example, and are not intended to give any limitation of size.

In general, the batteries 19 and 20 have one side H

- 9 -

normally disposed transverse to the support element, which has a greater length than a side L normally disposed on the length of the support element. In this way, the batteries 19 and 20 extend in a direction mainly transverse to the band 12, occupying the smallest longitudinal segment possible thereof, and thus guaranteeing optimum flexibility and wearability of the bracelet 10, since its elasticity and ability to adapt to the conformation and size of the part of the body on which the electronic apparatus 11 is applied are not compromised.

Advantageously, the two housing pockets 16 and 17 are disposed symmetrically with respect to a median axis of the electronic apparatus 11, so that the two feed batteries 19, 20 are disposed symmetrically with respect to the electronic apparatus 11, and the overall weight is well-balanced, to make the use of the electronic apparatus 11 more comfortable and ergonomic during working operations.

The band 12 also comprises, integrated therewith, two respective electric connection conductors 21, 22, respectively, one to connect the battery 19 with the electronic apparatus 11 and the other to connect in a similar manner the relative battery 20 with the electronic apparatus 11.

The electric conductors 21, 22 consist of respective electric cables, conductor tracks, metal blades or other known conductor systems.

The electric conductors 21, 22 in this case are disposed inside the thickness of the band 12, possibly guided by lateral stitches, but it is not excluded that they may be disposed in close proximity to the inner surface, or to the outer surface of the band 12.

In the embodiment shown in figs. 1 and 2, two feed batteries 19 and 20 are used, each disposed in a respective

- 10 -

housing pocket 16 and 17, but it is not excluded that, depending on the specific requirements of autonomy and ergonomics of the electronic apparatus 11, the batteries can have different shape, size and composition, and can be
5 greater in number, or disposed in a single or in three or more housing pockets.

For example, as shown in fig. 3, where the same reference numbers correspond to equivalent elements, the band 12 comprises six pockets 16, 16a and 16b; 17, 17a and 17b
10 disposed symmetrically in threes on one side and the other of the electronic apparatus 11, so as to house inside them respective batteries 19, 19a and 19b; 20, 20a and 20b, to feed the apparatus 11. In this embodiment, the greater size of the side H with respect to the side L of each battery
15 19, 19a and 19b; 20, 20a and 20b is evident, so as to guarantee great flexibility and wearability of the bracelet 10.

It is clear, however, that modifications and/or additions of parts may be made to the bracelet 10 as described
20 heretofore, without departing from the scope of the present invention.

For example, it comes within the scope of the present invention to provide an auxiliary battery, for example a buffer battery, integrated into the electronic apparatus
25 11. In this case, the auxiliary battery can be completely different from the feed batteries 19, 19a and 19b; and 20, 20a and 20b disposed in the respective housing pockets 16, 16a and 16b; and 17, 17a and 17b of the band 12.

It also comes within the scope of the present invention
30 to provide that instead of the housing pockets 16, 16a and 16b; and 17, 17a and 17b, seatings of a different type are provided, for example through seatings in the band 12, or others, provided that they allow the disposition of the

- 11 -

feed batteries 19, 19a and 19b; and 20, 20a and 20b integrated into the bracelet 10.

According to another variant, the housing pockets 16, 16a and 16b; and 17, 17a and 17b or the other types of seating
5 provided, can be made without distinction of the same material as the band 12, in rigid material or a combination of several materials, both rigid and flexible.

According to another variant, instead of Velcro® 15 and the through buckle 13, the band 12 can provide attachment
10 systems using buttons, snap-in means, eyelets or others of a known type, which allow to regulate the closure of the band 12 around the wrist.

It is also clear that, although the present invention has been described with reference to specific examples, a
15 person of skill in the art shall certainly be able to achieve many other equivalent forms of bracelet for a portable electronic apparatus, having the characteristics as set forth in the claims and hence all coming within the scope of protection defined thereby.

- 12 -

CLAIMS

1. Support element for a portable electronic apparatus (11), able to allow the user to wear said electronic apparatus (11), characterized in that it comprises at least
5 a housing seating (16, 16a and 16b; 17, 17a and 17b) made substantially inside the bulk of said support element (10) and able to contain at least an electric feed mean (19, 19a and 19b; 20, 20a and 20b), and electric connection means (21, 22) able to connect said electric feed mean (19, 19a
10 and 19b; 20, 20a and 20b) with said electronic apparatus (11).

2. Support element as in claim 1, characterized in that said at least one housing seating comprises a pocket (16, 16a and 16b; and 17, 17a and 17b) inside which said
15 electric feed mean (19, 19a and 19b; and 20, 20a and 20b) is disposed.

3. Support element as in claim 1 or 2, characterized in that said electric feed mean (19, 19a and 19b; and 20, 20a and 20b) is shaped so as to have a first side (H) disposed
20 transverse to said support element (10) and having a greater length with respect to a second side (L) normally disposed on the length of said support element (10).

4. Support element as in any claim hereinbefore, characterized in that it comprises two housing seatings
25 (16, 17) inside each of which a relative electric feed mean (19, 20) is able to be disposed, and in that said two housing seatings (16, 17) are made on opposite sides with respect to a median axis of said electronic apparatus (11).

5. Support element as in any claim from 1 to 3,
30 characterized in that it comprises a plurality of housing seatings (16, 16a and 16b; 17, 17a and 17b) inside each of which a relative electric feed mean (19, 19a and 19b; and 20, 20a and 20b) is able to be disposed, and in that said

- 13 -

plurality of housing seatings (16, 16a and 16b; 17, 17a and 17b) is disposed symmetrically with respect to a median axis of said electronic apparatus (11).

6. Support element as in any claim hereinbefore,
5 characterized in that said electric connection means (21, 22) consist of respective electric cables, conductor tracks, metal blades or other elements, able to conduct an electric feed signal from the respective electric feed mean (19, 20) to said electronic apparatus (11).

10 7. Support element as in any claim hereinbefore, characterized in that said electric connection means (21, 22) are disposed in close proximity to an outer surface of said support element (10).

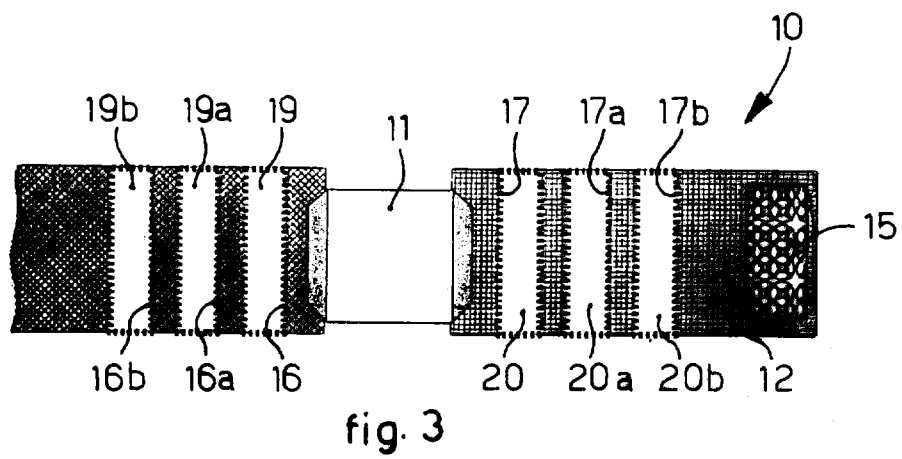
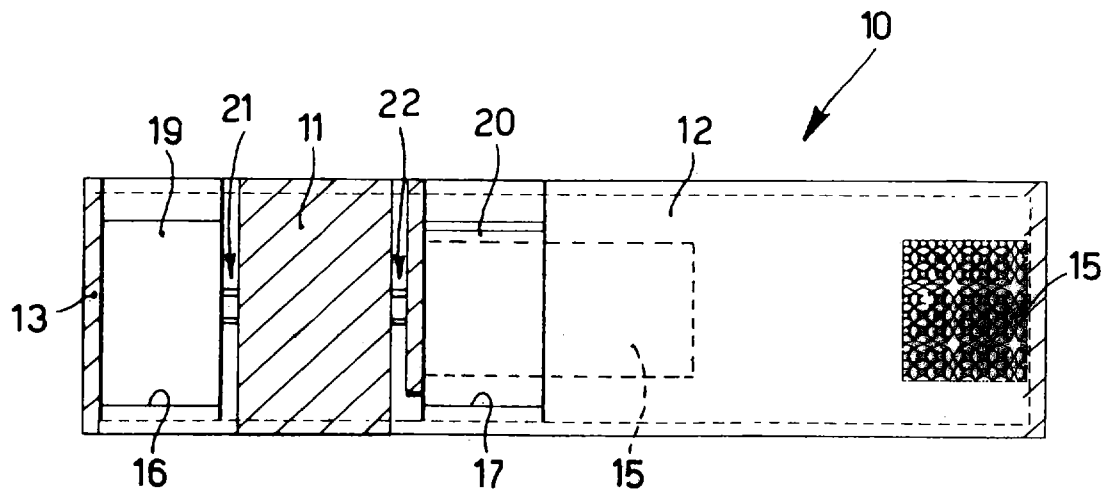
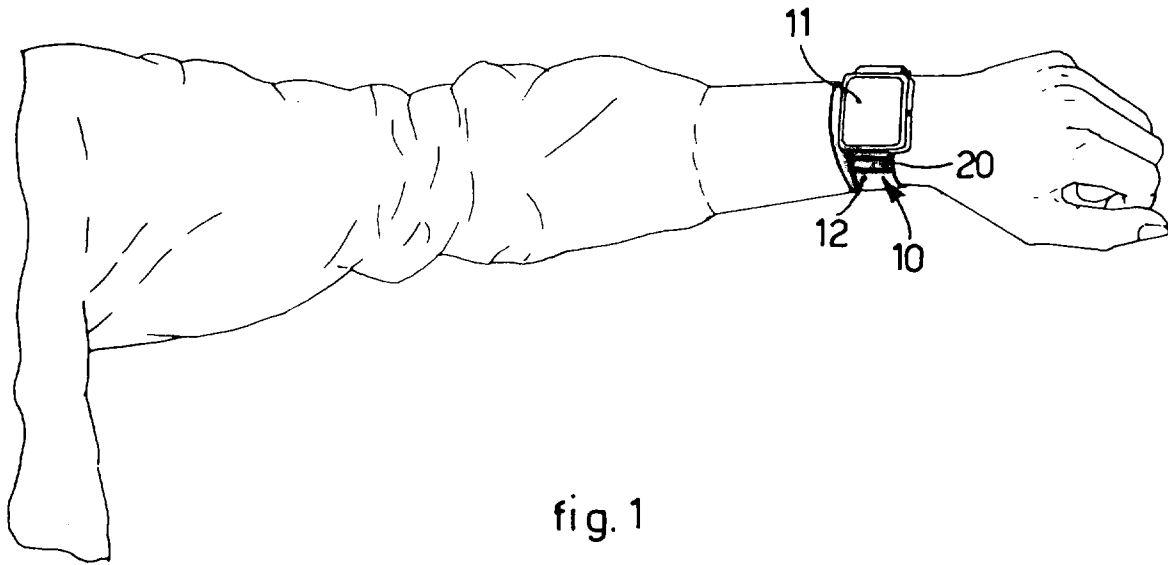
8. Support element as in any claim from 1 to 6,
15 characterized in that said electric connection means (21, 22) are disposed inside the thickness of said support element (10).

9. Support element as in any claim hereinbefore, characterized in that it consists of at least a band (12)
20 made of elasticized cotton.

10. Support element as in any claim hereinbefore, characterized in that it has an overall size equal to about 130x85 mm.

11. Support element as in claim 9 or 10, characterized in
25 that it comprises attachment means (13, 15) able to allow selective closing with the regulation of said band (12) on said user's wrist.

12. Support element as in claim 11, characterized in that said attachment means comprises a through buckle (13) and
30 at least two strips of Velcro® disposed on opposite ends and surfaces of said band (12).



INTERNATIONAL SEARCH REPORT

International application No

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A. CLASSIFICATION OF SUBJECT MATTER

INV. G06F1/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 100 19 166 A1 (KUNCIC, FRANZ ANDRAE) 18 October 2001 (2001-10-18) the whole document -----	1-12
X	EP 1 286 245 A (XYBERNAUT CORPORATION) 26 February 2003 (2003-02-26) the whole document -----	1-12
X	US 2003/222109 A1 (WEISS RAN) 4 December 2003 (2003-12-04) the whole document -----	1-12
X	US 6 375 079 B1 (SWARTZ JEROME) 23 April 2002 (2002-04-23) abstract column 4, line 66 - column 5, line 11 column 9, line 49 - column 10, line 18; figures 8,9 -----	1,6,7,10



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 10019166	A1	18-10-2001	NONE	
EP 1286245	A	26-02-2003	CA 2369386 A1 JP 2003076441 A US 2003035266 A1	17-02-2003 14-03-2003 20-02-2003
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