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(54) Title: KEYBOARD MUSICAL INSTRUMENT LEARNING AID

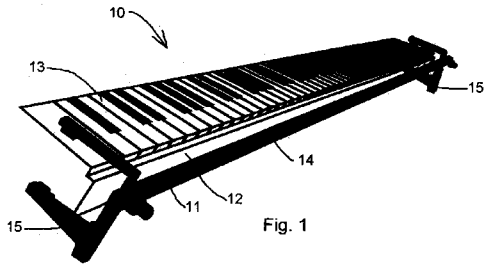

Fig. 1

(57) Abstract: A keyboard musical instrument learning aid having a plurality of keys including: sensing means operatively associated with the keyboard for sensing the presence of an object at a spaced disposition with respect to the keys of the keyboard; positioning means operatively associated with the sensing means for positioning the sensing means such that the spaced disposition is within a predetermined space with respect to the keys; and reporting means operatively associated with the sensing means and operable to report when an object is sensed to be present at the spaced disposition.

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KEYBOARD MUSICAL INSTRUMENT LEARNING AID

FIELD OF INVENTION

[0001] THIS INVENTION relates to a keyboard musical instrument learning aid. The invention has particular application to a learning aid for novice pupils of the piano. However, the invention is not limited to this field of use.

BACKGROUND ART

[0002] Students of piano are required to learn the correct position of the hands, fingers, wrist and forearm as one of the foundation skills in learning to play the piano. Similar foundation skills are a part of learning to play other keyboard musical instruments as well. One of the problems often encountered is that students may allow their wrists to drop too low. Sometimes, this can have a flow-on effect to poor posture and fatigue, and/or wrist or tendon strain. Another problem sometimes encountered is that students may overcompensate for having their wrists too low by raising their wrists to high. This can lead to poor finger control as well as the adverse effects on posture, fatigue and tendon strain.

[0003] In this specification, unless the context indicates otherwise, the term "learning aid" is to be taken to refer to a keyboard musical instrument learning aid and such term is to be taken to be synonymous with the term "keyboard musical instrument learning aid".

[0004] United States Patent No. 7,714,220 to Sony Computer Entertainment discloses a learning aid for teaching hand placement on a variety of objects, including sporting equipment and such musical instruments as guitars, saxophones, woodwind and brass instruments (the Sony invention). However, the Sony invention is directed to the teaching of accurate placement of the fingers of the hands on the object. Moreover, the instruments towards which the Sony invention is directed are either fretboard, fingerboard or button-key instruments, and is not suited to aid the learning of the correct hand position for playing a keyboard instrument, the correct hand position being essentially the same for all positions of the fingers on the keys; that is, for the position of the fingers on all of the different keys.

[0005] The present invention aims to provide a keyboard musical instrument learning aid which alleviates problems associated with teaching and learning of correct hand position for playing keyboard musical instruments. Other aims and advantages of the invention may become apparent from the following description.

DISCLOSURE OF THE INVENTION

[0006] With the foregoing in view, the present invention resides broadly in a keyboard musical instrument learning aid having a plurality of keys including:

sensing means operatively associated with the keyboard for sensing the presence of an object at a spaced disposition with respect to the keys of the keyboard;

positioning means operatively associated with the sensing means for positioning the sensing means such that the spaced disposition is within a predetermined space with respect to the keys; and

reporting means operatively associated with the sensing means and operable to report when an object is sensed to be present at the spaced disposition.

[0007] The sensing means may be mounted to the keyboard. The sensing means may include one or more movement sensors, energy beams or such like having associated energy sensors. For example, the energy beams may be light beams, the or each light beam and its associated sensor being arranged in substantial parallel alignment with the key slip of the keyboard. In such form, the spaced disposition is selected such that the spaced disposition is substantially at the lowest position for the wrists of the player according to a predetermined criterion. It will be appreciated that the predetermined criterion may be subjective, and therefore, the invention is not limited to any particular disposition of the sensing means with respect to the keys. However, the preferred arrangement is for the sensing means to be mounted such that the spaced disposition is at a position below which the hands of the player would be considered as too low for proper playing of the keys.

[0008] The reporting means may be operable to report to a person learning the keyboard, or to their teacher, or both. The reporting means may be constituted by an alarm operatively associated with the sensing means and operable to produce an alarm when an object is sensed to be present at the spaced disposition.

[0009] In one form, there are two movement sensors, one arranged for sensing when the hands are too low as hereinbefore described, and the other being arranged to sense when the hands are too high. For example, the movement sensors may detect movement by infra red sensing Different alarms may be provided, aural and/or visual, in any desired combination. For example, the alarm alerting the player and/or teacher to the hands being too high may be provided as less

intrusive to the player's concentration than the alarm for the hands being too low, it being appreciated that there are occasions in playing keyboards when the hands are lifted wholly from the keyboard to effect particular playing manoeuvres.

[0010] In another form, the sensing means may be in the form of a bar having a contact face. Accordingly, in another aspect, the present invention resides broadly in a keyboard musical instrument learning aid having a plurality of keys including:

a bar mountable to the keyboard in a spaced disposition from the keys;

a contact face formed on the bar for contact by the hands, wrist and/or wrist region of a player of the keyboard musical instrument; and

an alarm operatively associated with the contact face and operable to produce an alarm upon contact of the contact face by a player of the keyboard musical instrument.

[0011] Preferably, mounting brackets are provided for mounting to the ends of the keyboard. In such form, the sensing means is mountable to the mounting brackets, the parts being so formed and arranged for mounting the sensing means at the spaced disposition hereinbefore described. More preferably, adjustment means are provided in operative interposition between the sensing means and the mounting brackets for adjusting the position of the sensing means.

[0012] When the sensing means is provided as a bar, it is preferred to have a substantially flat upper face, such upper face substantially forming the contact face. The contact face may be convex upward and is provided substantially along the entire length of the bar. The contact face may wrap around the bar. The alarm is preferably formed to include an electro-sensitive film or coating along at least some of the contact face. The alarm may produce an audible or visual alarm activated by making contact with the electro-sensitive film or coating.

[0013] In a one form for learning the piano, the bar is spaced from and substantially parallel to the key slip of the piano keyboard, mounted such that the contact face is forward and upward of the key slip and the piano keys. The position of the contact face is selected such that it is below the normal position of the wrist when positioned for striking the white keys of the piano. When provided in the form of a light beam and associated sensor, the disposition of the sensing means is below the normal position of the wrist when positioned for playing the white keys of the piano. Of course, the hand moves over the white keys to strike the black keys such that the relative position of the contact face moves further up the wrist away from the hand. When a second

sensing means is provided for sensing when the hands are too high, it is preferred that the disposition of the sensing means is just above the normal position of the wrist when positioned for lifting the fingers from the black keys. Further sensing means may be provided just above or below the normal position of the hands when performing particular manoeuvres, such as passing the thumb under the fingers, repositioning the hands, performing trills, mordents or such like.

[0014] It will be seen that the present invention may be used to discipline a pupil learning to play a keyboard musical instrument to maintain correct posture and hand position. Accordingly, the present invention, in another aspect, resides broadly in a learning aid to assist a pupil learning to play a keyboard musical instrument including sensing means arranged in operative disposition with respect to the keyboard for sensing the position of the hands or wrists of the pupil and reporting means operatively associated with the sensing means for reporting when the pupil's hands or wrists are outside a predetermined position with respect to the keyboard whereby the pupil may be taught to maintain correct posture and/or hand position for playing the keyboard musical instrument.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] In order that the invention may be more readily understood and put into practical effect, two preferred embodiments of the present invention will now described with reference to the following drawings, and wherein:

Fig. 1 is a diagrammatic pictorial view of a piano keyboard and learning aid according to the invention;

Fig, 2 is a diagrammatic side view of the piano keyboard and learning aid of Fig. 1 showing the positioning of a hand of a player;

Fig. 3 is a diagrammatic detail view of a mounting bracket for the learning aid of Fig. 1;

Fig. 4 is a diagrammatic detail view of an adjustment assembly for the mounting bracket of Fig. 3;

Fig. 5 is a diagrammatic view of an alternative or additional adjustment assembly; and

Fig. 6 is a diagrammatic pictorial view of an alternative piano keyboard and learning aid according to the invention.

DETAILED DESCRIPTION OF THE DRAWINGS

[0016] The learning aid 10 shown in Fig. 1 includes a bar 11 mounted in front of and above a key slip of a piano keyboard 13. The bar is substantially parallel to the key slip 12. A touch-pad 14 extends part-way along a central portion of the bar intermediate its ends. The bar is supported in a selected position by pair of mounting brackets 15, one at or near each end of the bar. The touch pad constitutes at least in part the contact face described herein.

[0017] Referring to Fig. 2, the position of the touch pad is adjustable up and down in the directions indicated by vertical arrows 17 and forward and back in the directions indicated by horizontal arrows 18. The preferred position is below the normal position of the wrist of a user's hand 16 when positioned for striking the white keys of the piano. An adjustment assembly 19 holds the bar in position as well as providing fine adjustment

[0018] Each of the mounting brackets shown in Fig. 3 is each substantially the same. The mounting brackets include an upper angle section 21 and a lower angle section 22, each section being substantially in the form of an angle section to be clamped around each cheek block 29. The angle sections are connected to one another by a clamp assembly 22 shown in more detail in Fig. 5. The relative position of each angle with respect to the other may be coarsely adjusted by releasing and repositioning the angle sections with respect to one another to suit thickness of the cheek block, then re-engaging the clamp to which the mounting brackets are to be mounted. The clamps also include an internal angle for engagement with the lower front corner of the cheek block at 32.

[0019] Upper angle section includes an upper protection pad 24 interposed between the upper angle section and the cheek block. The upper protection pad is for protecting the finish on the cheek block. In a similar fashion, the lower angle section includes a lower pad 25 interposed between the lower face of the key bed and the lower angle section. The position of the bar is adjusted with respect to the upper angle section by an adjustment assembly 19.

[0020] The adjustment assembly 19 shown in Fig. 4 includes a set screw 30 having a head which can slide up and down in the direction of arrows 17 along a slot 28 in the upper angle section when the adjustment assembly is not tightened up. The set screw projects outwardly into a threaded rod 34 which may be tightened against the outer face of the upper angle section by turning a fixing knob 37 which is fixed to the end of the threaded rod. The threaded rod passes through a sleeve 35 which also passes through the bar, but is free to rotate with respect to the

threaded rod and the rod. The sleeve has an internal thread for threaded engagement with the threaded rod so that the bar may be adjusted in a substantially horizontal direction according to arrows 18 by rotation of an adjustment knob 36 fixed to one end of the threaded rod.

[0021] The clamp assembly 39 may be provided for rapid adjustment of the upper and lower clamp sections for mounting to the keyboard. The clamp assembly includes a main body through which a vertical bar 26 of the upper angle section of the clamp 21 passes. The main body is shown with an outer wall nearest the viewer removed to reveal the internal workings thereof. The alternative or additional adjustment assembly is shown the left-hand version facing the front of the piano when mounted thereto, the right hand version being substantially identical but for being a mirror image of that shown.

[0022] The main body has a cutaway corner portion 44 in the top corner facing the opposing assembly. A lever 41 is pivotally mounted by way of a lever pivot 42 to the main body for arcuate pivoting movement between a rest position as shown and a crawl position by rotation in the direction of arrow 43 by pressing against an activation face 45. The cutaway corner portion 44 limits the pivoting of the lever since activation face is not readily pressed further to the left than the position of the cutaway corner.

[0023] The lever has an engagement portion 46 which engages with a crawl bar 47. The crawl bar has an aperture sized for engagement with the edges of the vertical bar and is retained in its rest position against a crawl stop 49 formed as part of the main body as shown by a pair of crawl springs 48. The crawl springs also serve to retain the lever in its rest position. A ratchet bar 50 is also provided to restrict the movement of the quick adjustment assembly against the direction of the crawl produced by depressing the lever. The ratchet bar is retained for pivoting movement by restraining one end between to retention pillars 51, the other end being moveable downward against a ratchet spring 52 from a ratchet release/stop 53 which limits the upward pivoting of the ratchet bar. The ratchet release/stop is provided in the form of a bar which extends forward of the front face of the main body and may be moved downward to release the ratchet bar whereby the quick adjustment assembly may be moved against the direction produced by activation of the lever.

[0024] The alternative learning aid 60 shown in Fig. 6 is the same in many respects as the learning aid 10 shown in Fig. 1, but it the bar is substituted by a sensor field 61 aligned in front of and above the level of the key slip 12 of the piano keyboard 13. The sensor field is substantially

parallel to the key slip and of a rod-like configuration by virtue of a collimated arrangement for a sensor 62 supported in a selected position by an alternative mounting bracket 65. A second sensor field 63 is substantially parallel to and spaced above the keys for sensing when the hands or fingers are too high by a second sensor 64. The sensors are shown mounted to the right cheek block, but it will be appreciated that an opposite handed alternative mounting bracket may be provided to mount to the lift cheek block. If desired a camera may also be mounted to the mounting bracket which, in an exemplary form, may be attached to the cheek block by vacuum cups in the manner of a vacuum clamp.

[0025] In use, a keyboard musical instrument learning aid may be temporarily attached to a piano or other keyboard musical instrument and adjusted to suit the playing position for the hands of a pupil learning to play the piano or other instrument. Each time the pupil lowers his or her hands too low, contact is made with the contact surface, whereupon the alarm will illuminate to alert the pupil (and his or her teacher). The contact surface is formed from an electro sensitive material that may make or break a low voltage electrical circuit powered, for example, by a dry cell or battery. The electro sensitive material may be electrically insulated from the user or provided as conductors having a zero potential. The power supply, circuitry and speaker for the alarm may be mounted to one of the mounting brackets.

[0026] The contact surface is provided along the central portion of the keyboard because that is where the hands are positioned most of the time for playing the keyboard. However, the contact surface may be extended across the whole length of the bar is desired. The learning aid may be removed quickly by releasing the clamp such as for pupils who are more advanced and do not require the learning aid.

[0027] Although the invention has been described with reference to a specific example, it will be appreciated that the invention may be embodied in other forms as would be apparent to those skilled in the art within the broad scope and ambit of the invention as herein set forth and defined by the following claims.

CLAIMS:

1. A keyboard musical instrument learning aid having a plurality of keys including:

sensing means operatively associated with the keyboard for sensing the presence of an object at a spaced disposition with respect to the keys of the keyboard;

positioning means operatively associated with the sensing means for positioning the sensing means such that the spaced disposition is within a predetermined space with respect to the keys; and

reporting means operatively associated with the sensing means and operable to report when an object is sensed to be present at the spaced disposition.

2. The keyboard musical instrument learning aid according to Claim 1, wherein the sensing means includes one or more movement sensors.

3. The keyboard musical instrument learning aid according to Claim 2, wherein the or each movement sensor is provided in an integral sensing device whereby the positioning mean may be positioned at one end of the keyboard.

4. The keyboard musical instrument learning aid according to any one of the preceding claims, wherein the sensing means are mounted such that the spaced disposition is at a position below which the hands of the player would be considered as too low for proper playing of the keys.

5. The keyboard musical instrument learning aid according to any one of the preceding claims, wherein there are two energy beams and two associated energy sensors, one arranged for sensing when the hands are too low for proper playing of the keys, and the other is arranged for sensing when the hands are too high.

6. The keyboard musical instrument learning aid according to any one of the preceding claims wherein the sensing means may includes a bar having a contact face.

7. The keyboard musical instrument leaning aid according to Claim 6, wherein said bar is mountable to the keyboard in a spaced disposition from the keys and includes a contact face formed on the bar for contact by the hands, wrist and/or wrist region of a player of the keyboard musical instrument.

8. The keyboard musical instrument learning aid according to Claim 6 or Claim 7, wherein mounting brackets are provided for mounting to the ends of the keyboard whereby said sensing means is mountable to the mounting brackets, the parts being so formed and arranged for mounting the sensing means at said spaced disposition.

9. The keyboard musical instrument learning aid according to Claim 8, wherein adjustment means are provided in operative interposition between the sensing means and the mounting brackets for adjusting the position of the sensing means.

10. The keyboard musical instrument learning aid according to Claim 9, wherein said bar is mountable at a position spaced from and substantially parallel to the key slip of the piano keyboard, mounted such that the contact face is forward and upward of the key slip and the piano keys, the position of the contact face being selected such that it is below the normal position of the wrist when positioned for striking the white keys of the piano.

11. The keyboard musical instrument learning aid according to Claim 10, wherein the disposition of the sensing means is below the normal position of the wrist when positioned for playing the white keys of the piano.

12. The keyboard musical instrument learning aid according to Claim 11, wherein second sensing means are provided for sensing when the hands are too high, the disposition of the sensing means being selected to be just above the normal position of the wrist when positioned for lifting the fingers from the black keys of the keyboard.

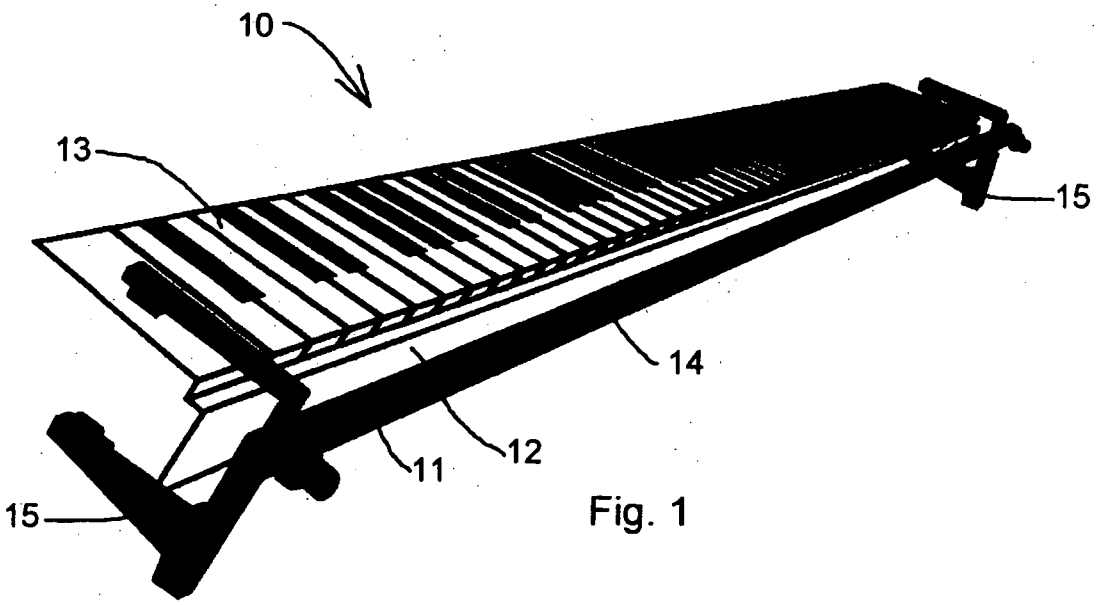

Fig. 1

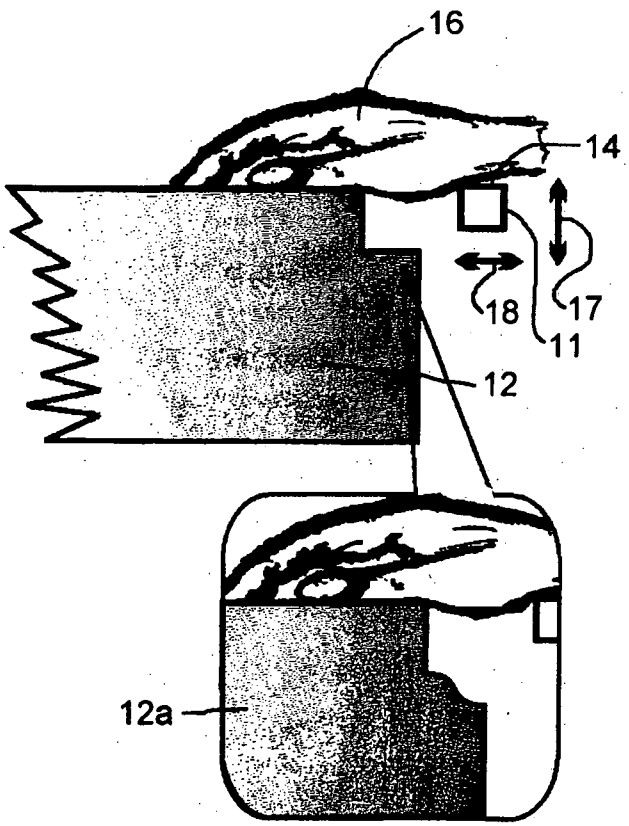

Fig. 2

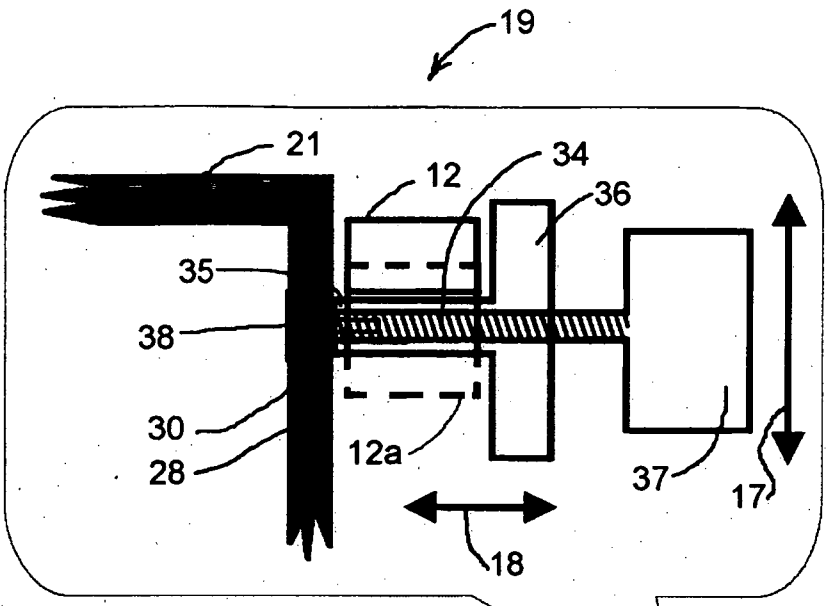

Fig. 4

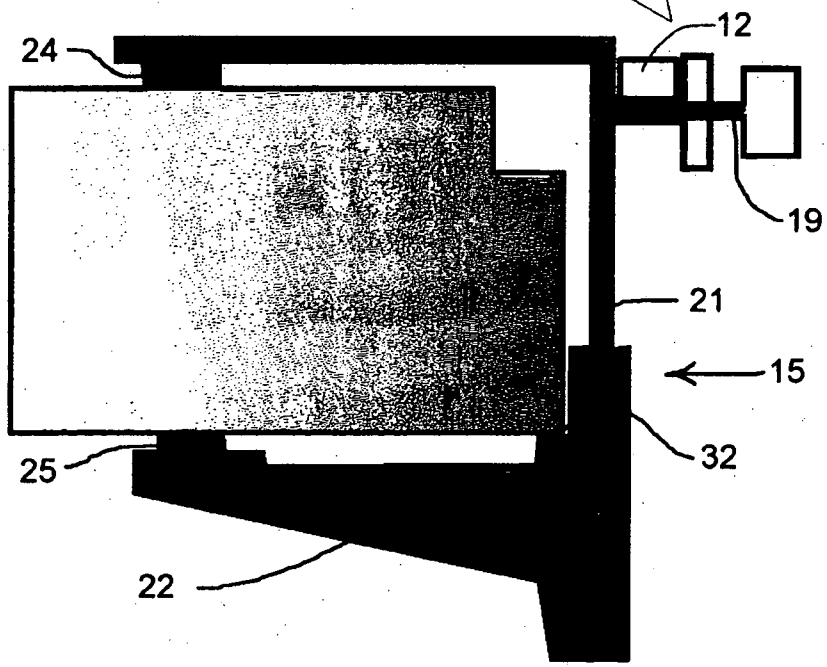

Fig. 3

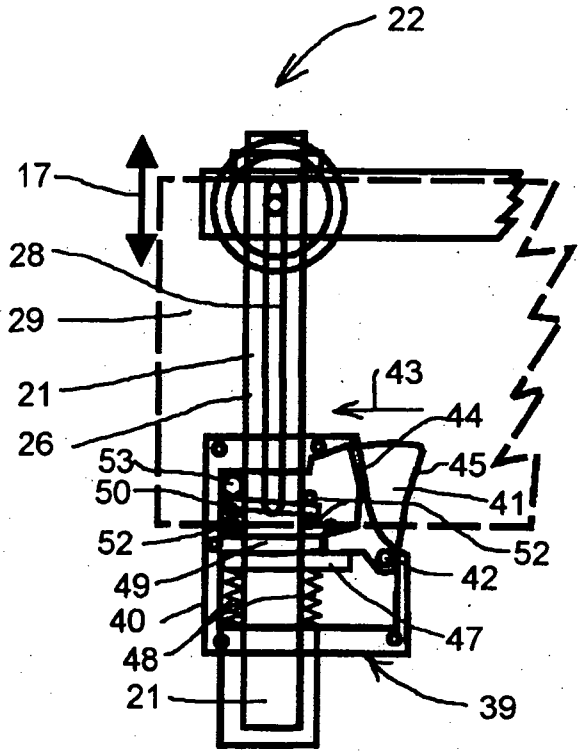
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Fig. 5

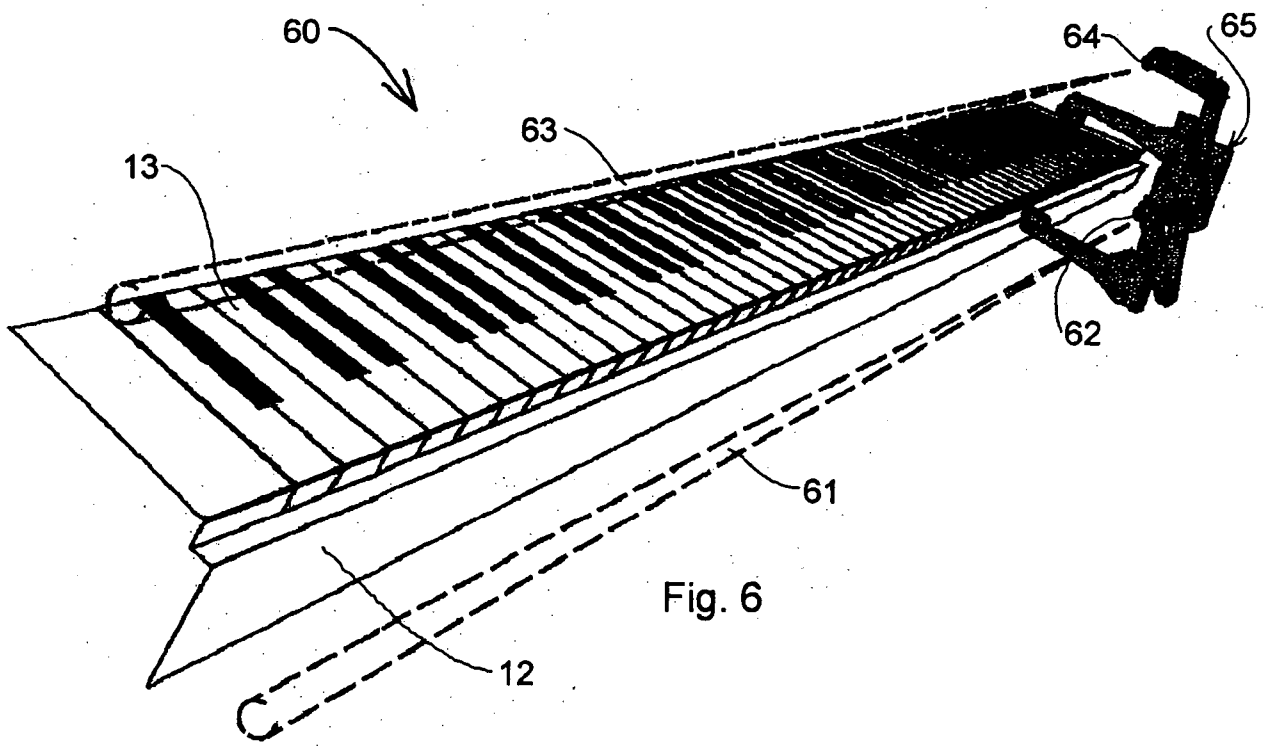
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Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2010/001623

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

G09B 15/06 (2006.01)

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)

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 practicable, search terms used)
DWPI & EPODOC - keywords (keyboard, learn, sensor, position, display) and like terms; USPTO, ESP@CE, Google Patents - Keywords (piano, sensor, position, display)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2009/0064849 A1 (FESTEJO) 12 March 2009 Whole document	
A	US 4762436 (HERZOG et al) 9 August 1988 Whole document	
A	US 3726176 (KAPLAN) 10 April 1973 Whole document	

☐ Further documents are listed in the continuation of Box C ☒ See patent family annex

* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 January 2011	7 FEB 2011
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/AU2010/001623

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member			
US	2009064849	US	7714220		
US	4762436	NONE			
US	3726176	GB	1405130	JP	48051729

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX