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Chang

(54) **CONTROL METHOD OF TOUCH CONTROL DEVICE**

(71) Applicant: **Wen-Fu Chang**, Hsinchu City (TW)

(72) Inventor: **Wen-Fu Chang**, Hsinchu City (TW)

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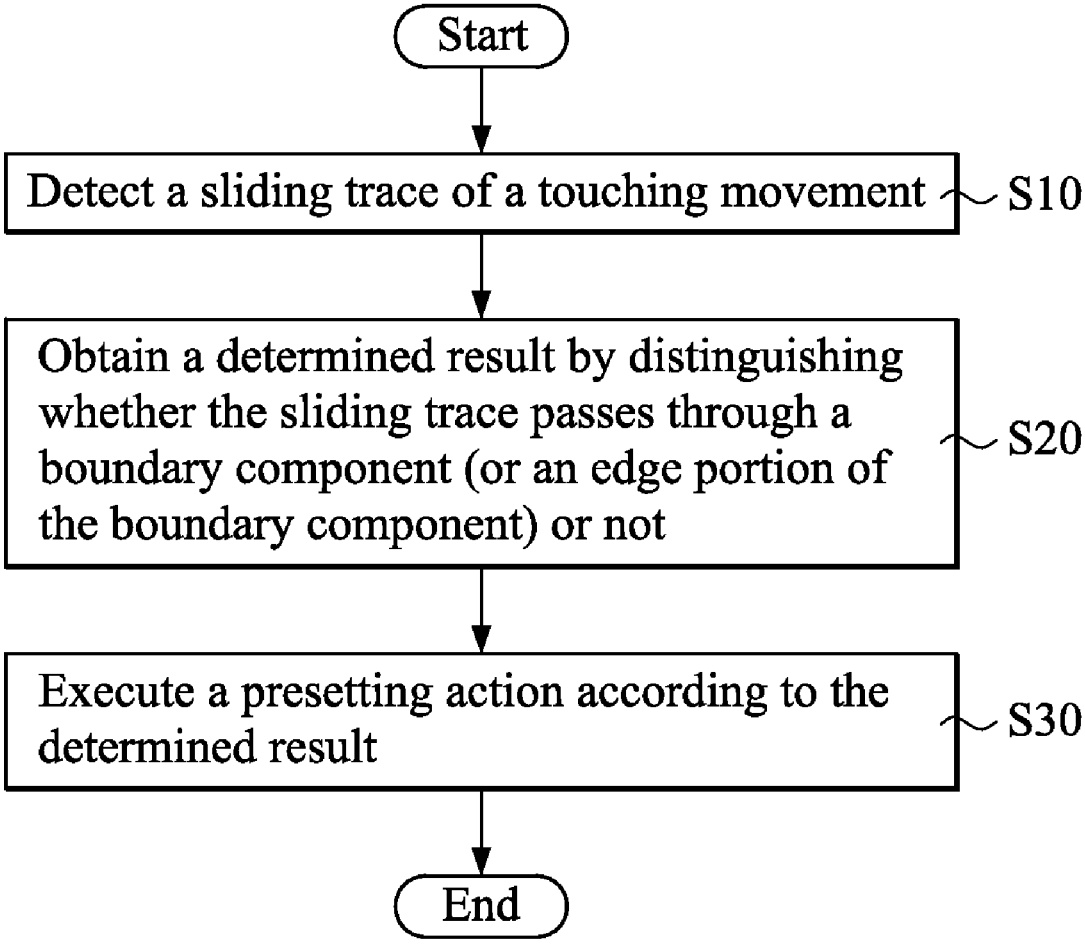
(57) **ABSTRACT**

Disclosed is a control method of touch control device provided for instinctively controlling a touch control device in various manners. The control method includes steps as follows. While a touching movement is sensed on a touch panel of the touch control device, detecting a sliding trace of the touching movement; obtaining a determined result by distinguishing whether the sliding trace passes through a boundary component or not and by distinguishing whether the sliding trace passes through a edge portion of the boundary component or not; executing a presetting action according to the determined result.



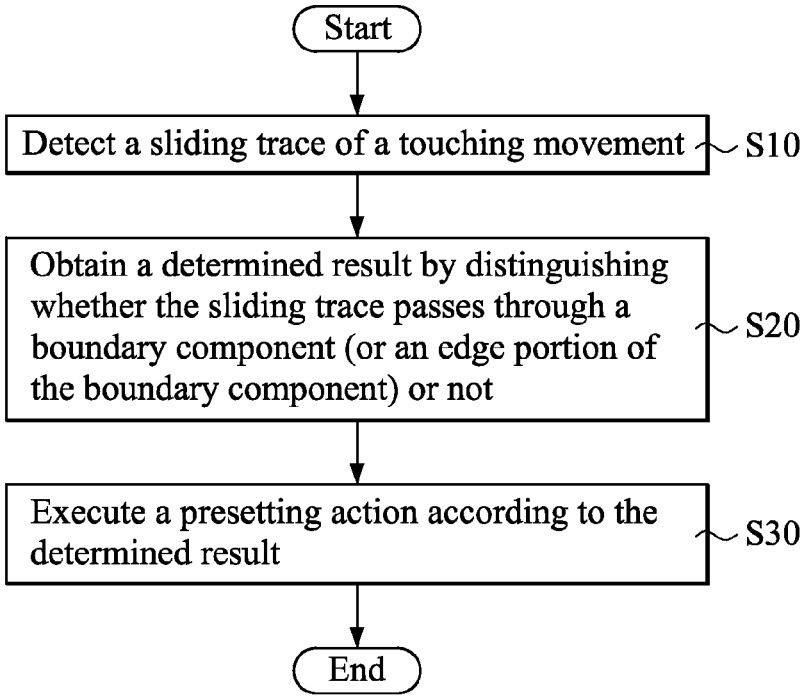

Start
Detect a sliding trace of a touching movement
S10
Obtain a determined result by distinguishing whether the sliding trace passes through a boundary component (or an edge portion of the boundary component) or not
S20
Execute a presetting action according to the determined result
S30
End

FIG.1

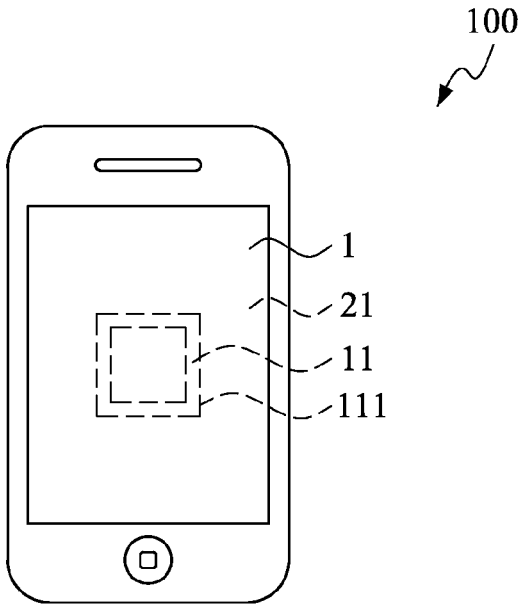

100
1
21
11
111

FIG.2

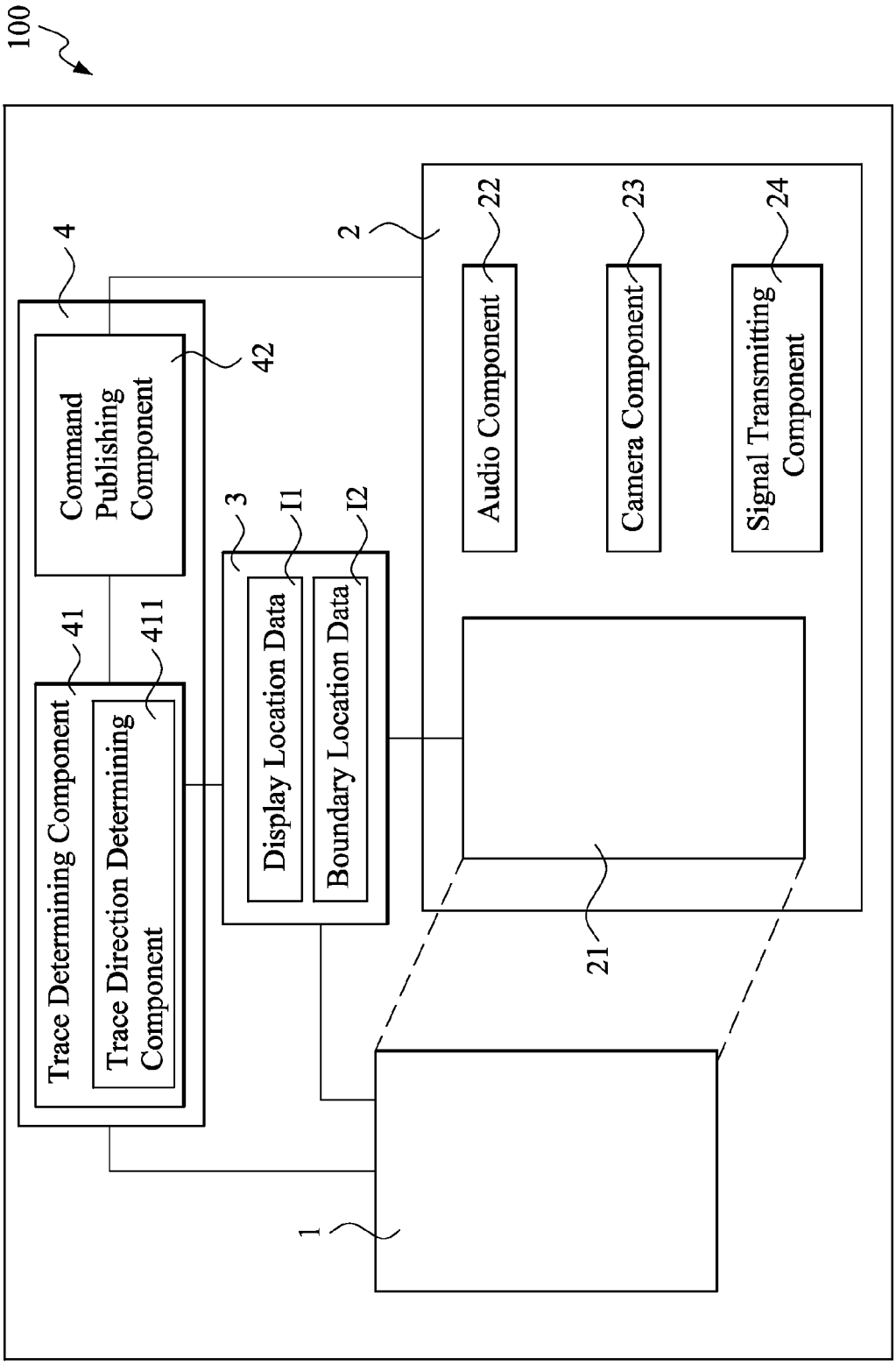

100
4
2
22
23
24
Command Publishing Component
42
Audio Component
Camera Component
Signal Transmitting Component
3
I1
I2
41
411
Trace Determining Component
Trace Direction Determining Component
Display Location Data
Boundary Location Data
21
1

FIG.3

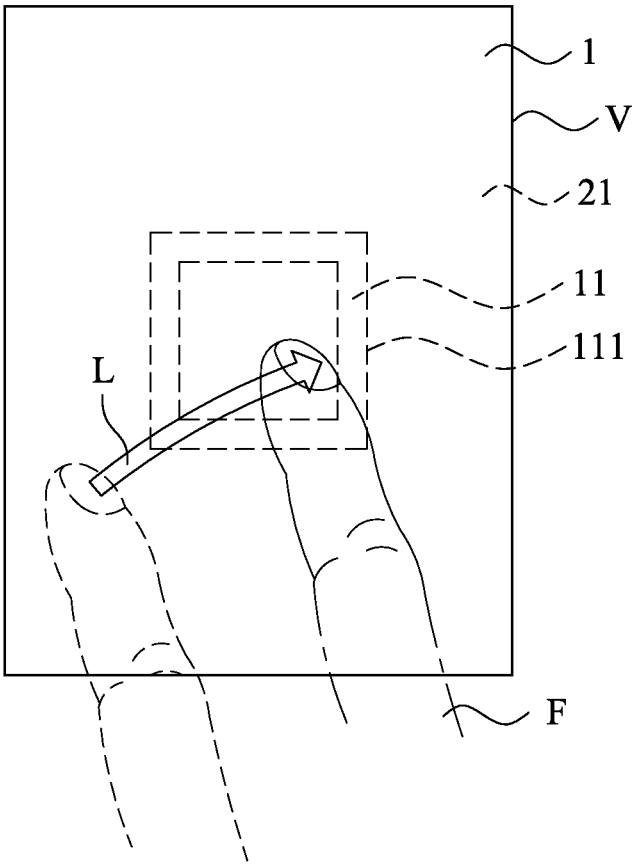


FIG.4

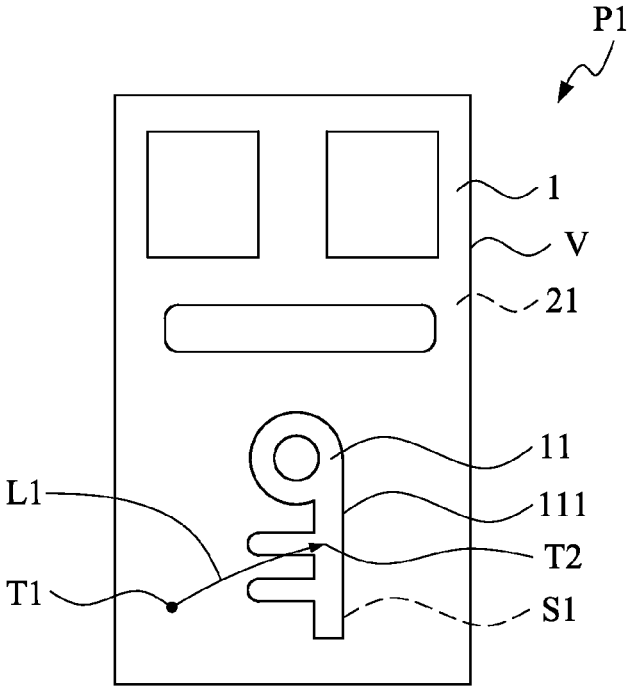

P1
1
V
21
11
111
T2
S1
L1
T1

FIG.5

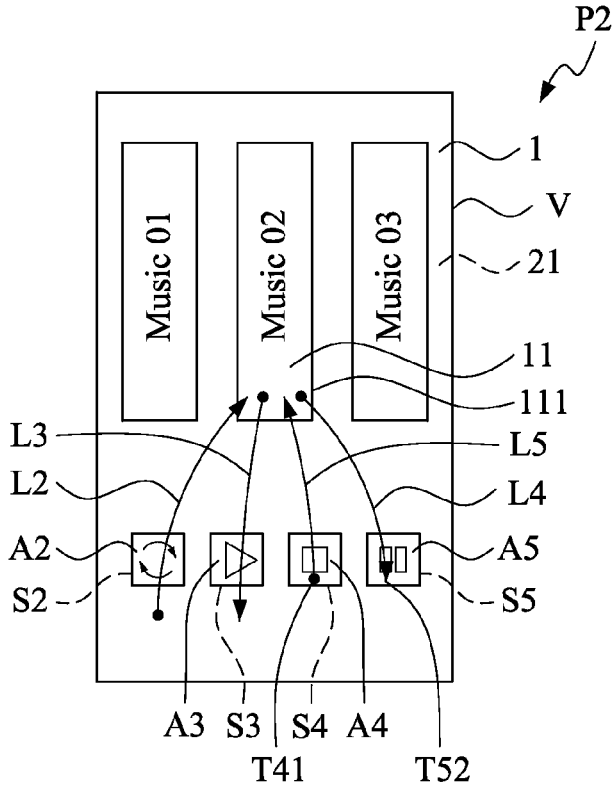

P2
1
V
21
Music 01
Music 02
Music 03
11
111
L3
L5
L2
L4
A2
A5
S2
S5
A3
S3
S4
A4
T41
T52

FIG.6

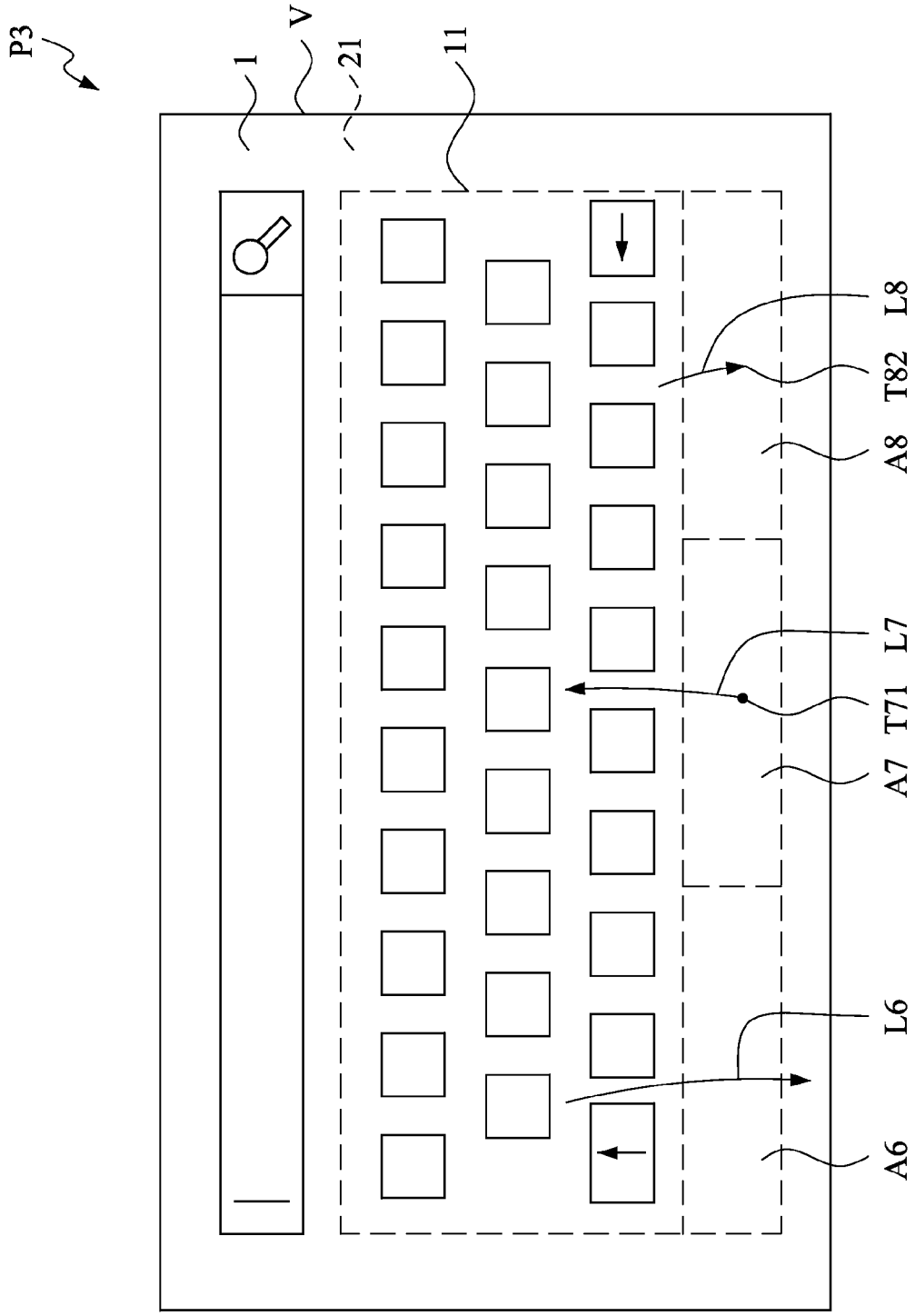


FIG.7

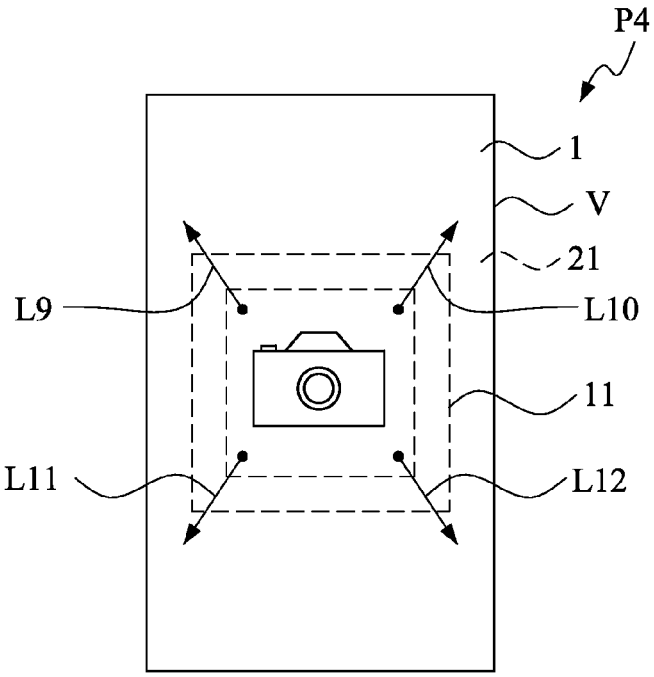


FIG.8

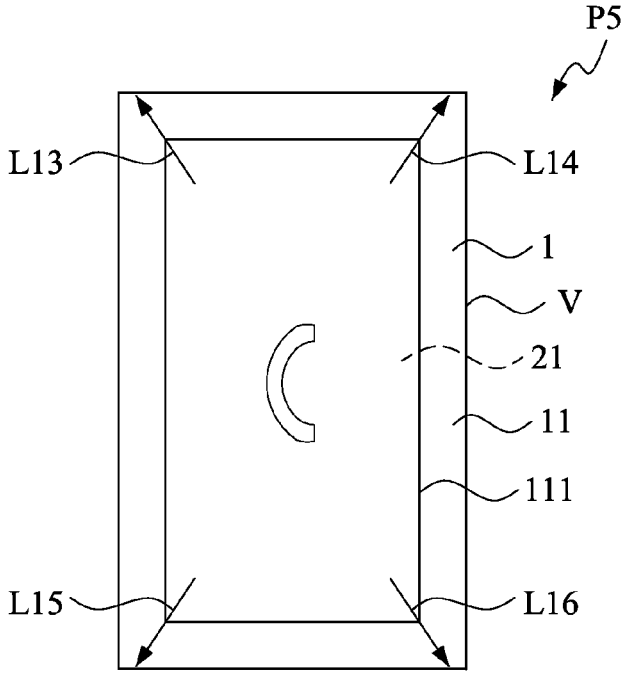


FIG.9

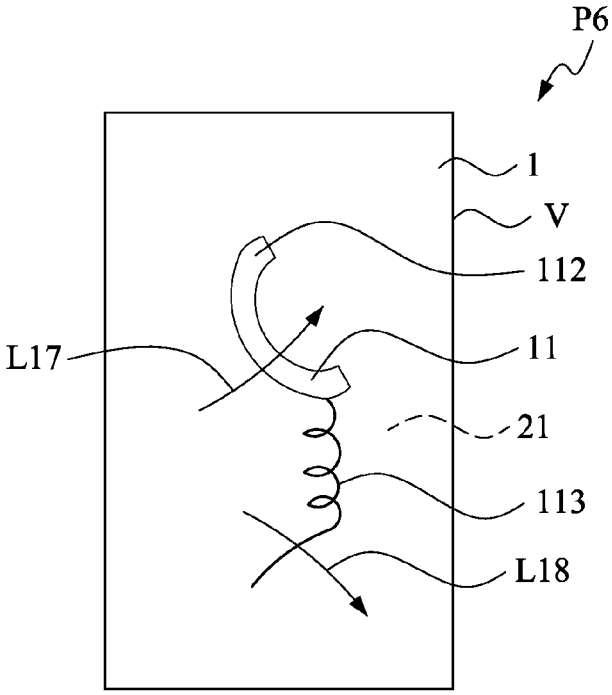


FIG.10

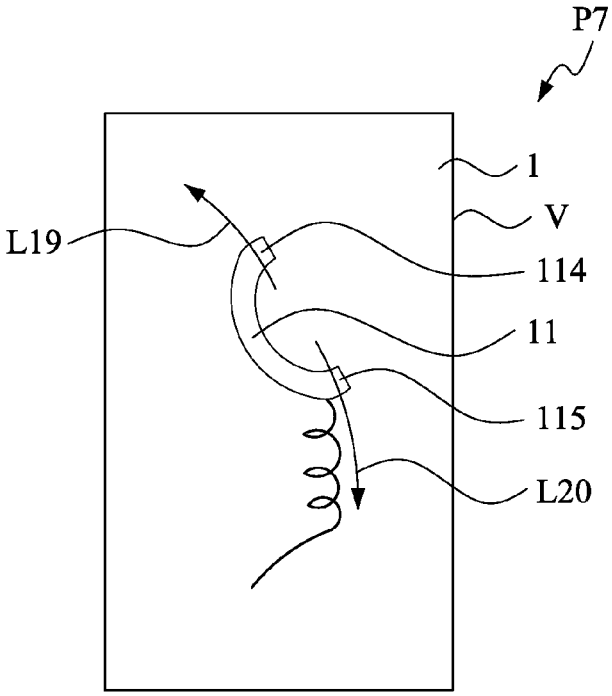


FIG.11

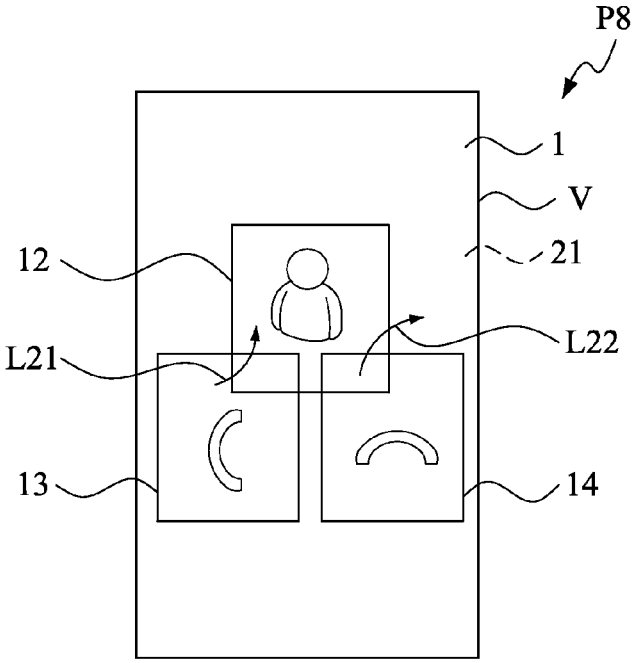


FIG.12

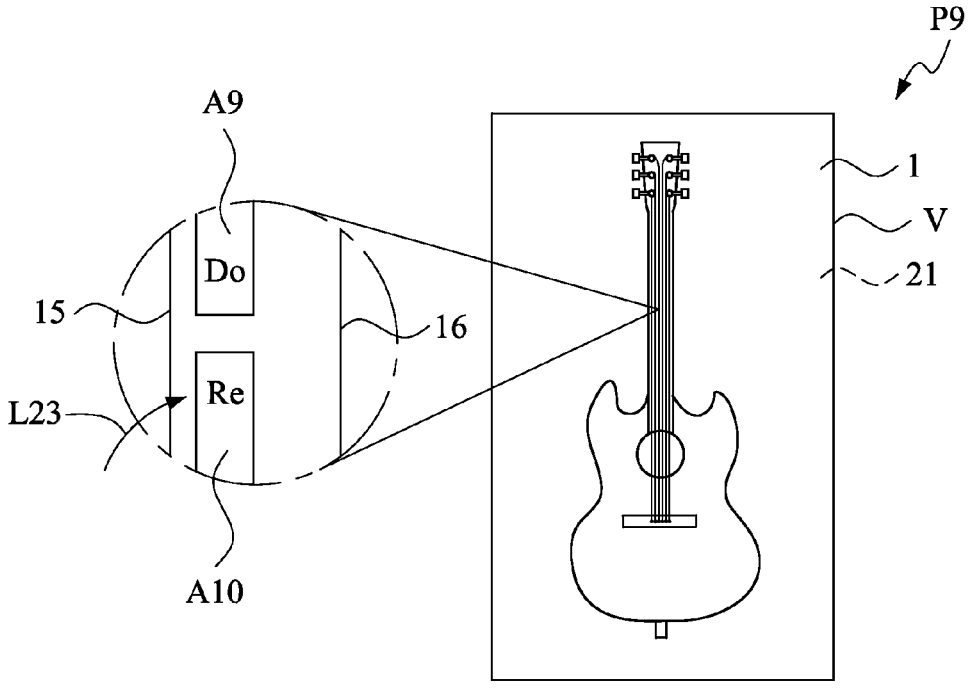


FIG.13

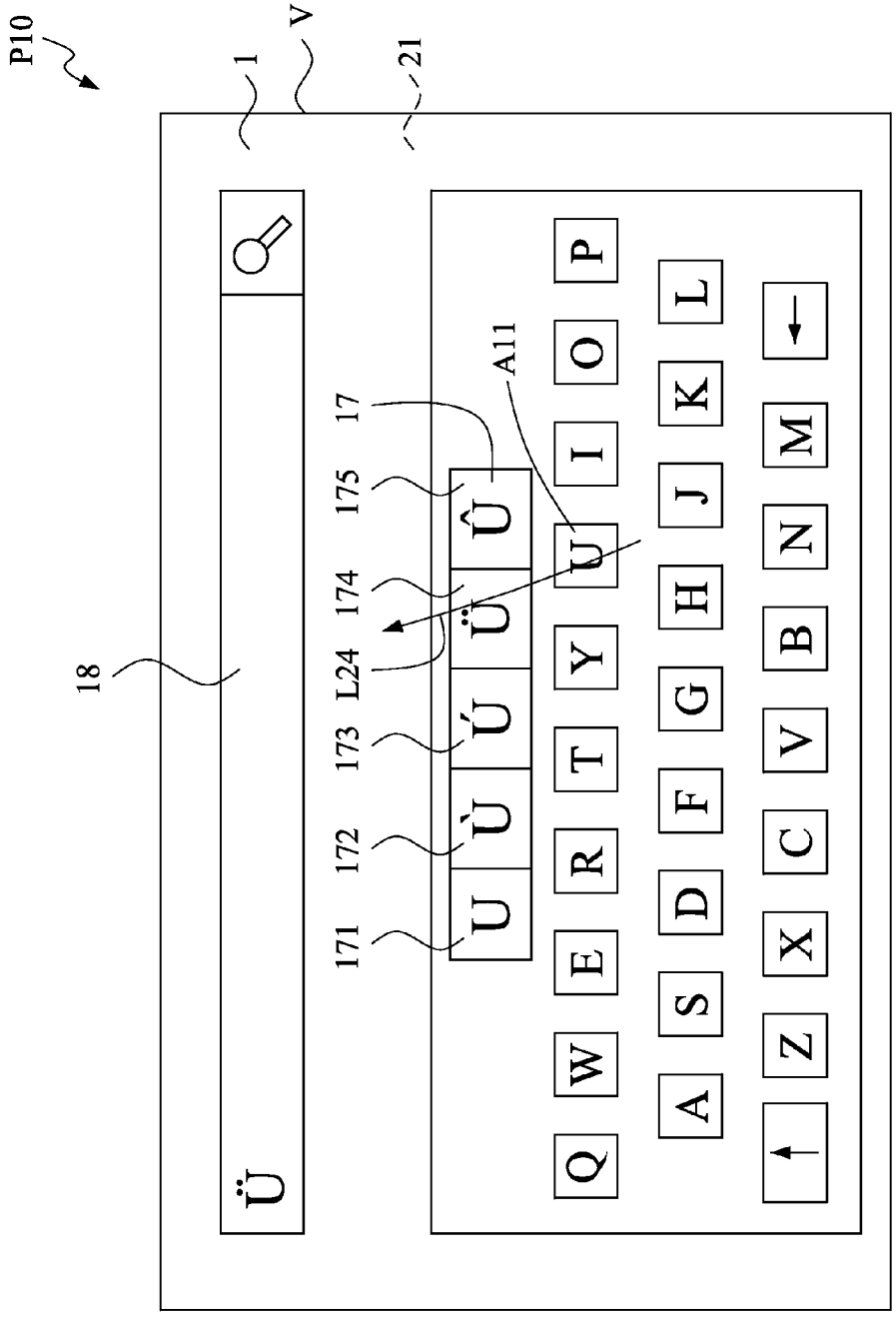

P10
1
V
21
18
Ü
17
175
174
L24
173
172
171
A11
Ù Ú Ü Û
U
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M

FIG.14

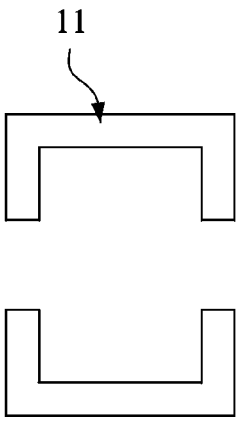


FIG.15A

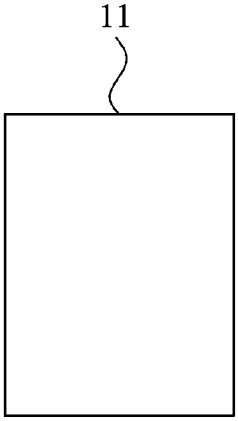


FIG.15B

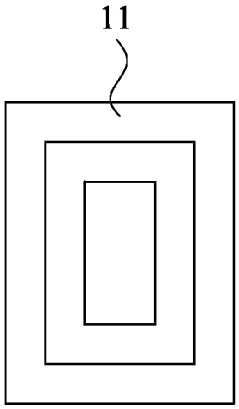


FIG.15C

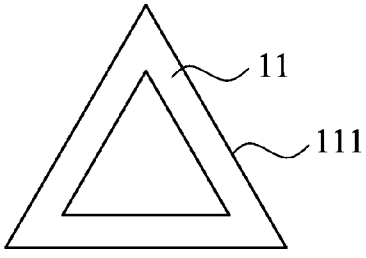


FIG.15D

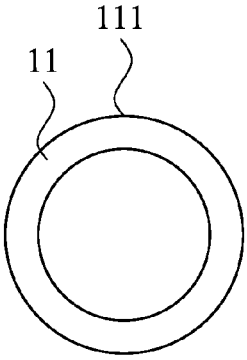


FIG.15E

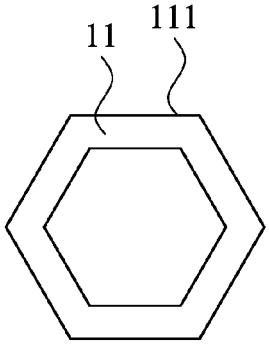


FIG.15F

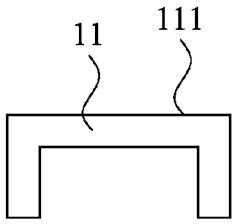


FIG.15G

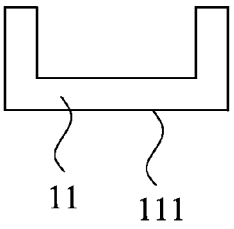


FIG.15H

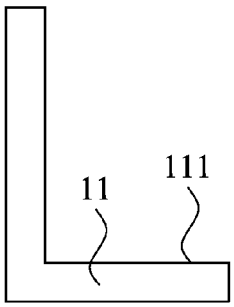


FIG.15I

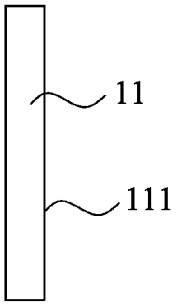


FIG.15J

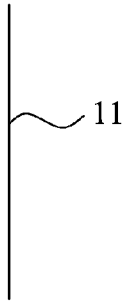


FIG.15K

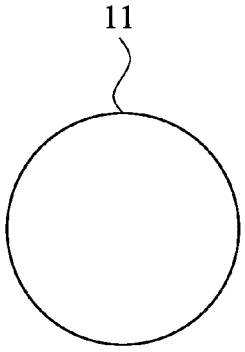


FIG.15L

CONTROL METHOD OF TOUCH CONTROL DEVICE

FIELD OF THE INVENTION

[0001] The present invention relates to a control method of touch control device, and more particularly to a control method for executing action according to a sliding style that a sliding trace passes through a boundary.

BACKGROUND OF THE INVENTION

[0002] In trend of rapidly development of the technology, a touch panel has been broadly used as an operating interface for a variety of touch control devices, such as computers (e.g. desktop computers, notebooks, and tablet computers) and mobile devices (e.g. cellular phones and personal digital assistant devices).

[0003] The touch panel is used for detecting the touching position of an object, such as a finger or a touch pen, that touches the surface of the touch panel. It commonly displays a plurality of icons on the touch panel, where each icon is corresponding to a program that a specific software object will run. Accordingly, a user can execute the specific software object by clicking the targeted icon for requesting the touch control device to execute a software program.

[0004] With the improvement of the touch control devices, more and more program menus and icons are allocated on the touch panel. However, the size of the touch panel is limited, so a user becomes needs to operate a touch panel by switching several pages and click many icons or symbols for a single purpose of operation.

SUMMARY OF THE INVENTION

[0005] In view of the description mentioned above, it requests a lot of selecting steps in page switching and needs to take time to repeat controlling the clicking action of the touch control device. It is thus not intuitive for users and much hardware resource of the touch control device is wasted. Therefore, it becomes an important issue to simplify a control method for operating the touch control device.

[0006] Accordingly, an aspect of the present invention is to provide a control method of touch control device to solve the problems.

[0007] The control method of the present invention includes steps as follows. (a) detecting a sliding trace of a touching movement on a touch panel; (b) obtaining a determined result by distinguishing whether the sliding trace passes through a boundary component of the touch panel or not and by distinguishing whether the sliding trace passes through an edge portion of the boundary component or not; and (c) executing a presetting action according to the determined result.

[0008] According to an embodiment of the present invention, the shape of the boundary component is a shape selected from a group including frame-shaped form, strip-shaped form, and spot-shaped form.

[0009] According to an embodiment of the present invention, the boundary component appears on the touch panel or is hidden from view on the touch panel.

[0010] According to an embodiment of the present invention, the touch panel is provided with a plurality of boundary components, at least two of the plurality of the boundary components are commonly used for corresponding to an execution action, and in the step (c) while the sliding trace is distinguished as having a trace be passing through a plurality of boundary components that commonly corresponding to an execution action, or the siding trace is distinguished as having a trace be passing through the edge portions of the plurality of boundary components that commonly corresponding to an execution action, then a presetting action that runs the execution action is executed.

[0011] According to an embodiment of the present invention, in the step (b), it further includes a step of determining a direction of the sliding trace that passes through the boundary component or a direction of the sliding trace that passes through the edge portion of the boundary component.

[0012] According to an embodiment of the present invention, the touch panel is provided with a target area, the target area corresponds to a corresponding target action, in the step (c) while the sliding trace is distinguished as having a trace be passing through the boundary component or through the edge portion of the boundary component, and the sliding trace is distinguished as having a trace be sliding over the target area, then a presetting action of the corresponding target action is executed.

[0013] According to an embodiment of the present invention, in the step (c), the presetting action is a corresponding target action that corresponds to a target area nearest to the sliding trace.

[0014] According to an embodiment of the present invention, the boundary component has a plurality of subsidiary boundary components, and each subsidiary boundary component corresponds to a corresponding target action respectively.

[0015] According to an embodiment of the present invention, the boundary component has a plurality of subsidiary boundary components, and at least two of the plurality of the subsidiary boundary components commonly used for corresponding to a co-corresponding action.

[0016] According to an embodiment of the present invention, the boundary component has a region portion, the region portion corresponds to a corresponding target action, in the step (c), while the sliding trace is distinguished as having a trace be passing through the boundary component or the edge portion of the boundary component, and the sliding trace is distinguished as having a trace be sliding over the region portion, then a presetting action of the corresponding target action is executed.

[0017] By means of technical means of the present invention, it provides a control method which is different from the conventional clicking method. By the control method of the present invention, the touch control device executes an operating action by sliding a sliding trace and that whether the sliding trace passes through a boundary or not is distinguished. It thus requests less simplifies the processes of choosing a software object for a user. It further reduces the step, and saves the time and hardware resource while operating the touch control device. In addition, the operation of sliding control method is more intuitive, easier for operation, and brings more fun for a user.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings.

[0019] FIG. **1** is a flowchart illustrating the control method according to an embodiment of the present invention;

[0020] FIG. **2** is a schematic diagram illustrating a touch control device according to an embodiment of the present invention;

[0021] FIG. **3** is a block diagram illustrating a touch control device according to an embodiment of the present invention;

[0022] FIG. **4** is a schematic diagram illustrating the control method according to an embodiment of the present invention;

[0023] FIG. **5** is a schematic diagram illustrating a main page of the touch control device according to an embodiment of the present invention;

[0024] FIG. **6** is a schematic diagram illustrating a multimedia playing page of the touch control device according to an embodiment of the present invention;

[0025] FIG. **7** is a schematic diagram illustrating a keyboard inputting page of the touch control device according to an embodiment of the present invention;

[0026] FIG. **8** is a schematic diagram illustrating a photography capturing page of the touch control device according to an embodiment of the present invention;

[0027] FIG. **9** is a schematic diagram illustrating a signal transmitting page of the touch control device according to an embodiment of the present invention;

[0028] FIG. **10** is a schematic diagram illustrating a signal transmitting page of the touch control device according to an embodiment of the present invention;

[0029] FIG. **11** is a schematic diagram illustrating a signal transmitting page of the touch control device according to an embodiment of the present invention;

[0030] FIG. **12** is a schematic diagram illustrating a signal transmitting page of the touch control device according to an embodiment of the present invention;

[0031] FIG. **13** is a schematic diagram illustrating a musical instrument playing page of the touch control device according to an embodiment of the present invention;

[0032] FIG. **14** is a schematic diagram illustrating a keyboard inputting page of the touch control device according to an embodiment of the present invention;

[0033] FIGS. **15**A-**15**L are schematic diagrams illustrating boundary components according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0034] Refer to FIG. **1**. FIG. **1** is a flowchart illustrating the control method according to an embodiment of the present invention. And also refer to FIGS. **2**-**4**. The control method of the present invention is described as follows. The control method of the present invention includes steps as follows. While a touching movement is sensed on a touch panel of a touch control device, it detects a sliding trace of the touching movement (step S**10**); it obtains a determined result by distinguishing whether the sliding trace passes through the boundary component or not and by distinguishing whether the sliding trace passes through an edge portion of the boundary component or not (step S**20**); and it executes a presetting action according to the determined result (step S**30**).

[0035] Specifically, in general, the control method of the present invention is used for controlling a touch control device **100**. The touch control device **100** may be a computer, a personal digital assistant, a satellite navigation device, or other devices with a touch panel.

[0036] In this embodiment, the touch control device **100** has a touch panel **1**, an output input means **2**, a location data storing component **3**, and a control means **4**. A display component **21** of the output input means **2** is coupled to the touch panel **1** and is stacked under the touch panel **1**. The display component **21** has a visible area V for displaying a page. In this embodiment, the display component **21** is a screen, and the touch panel **1** is a transparent glass capacitance touch panel. The page within the visible area V of the display component **21** can be displayed through the touch panel **1**. In other embodiments, the touch panel **1** also can be a resistance touch panel, an infrared ray touch panel, or the like. The location data storing component **3** electrically connects with the touch panel **1** and the display component **21**, and the location data storing component **3** stores a display location data I**1** and a boundary location data I**2**. In this embodiment, the display component **21** can display a plurality of the pages. The display location data I**1** includes the location of the information that displays on each page of the display component **21**. The boundary location data I**2** includes a plurality of coordinate positions that displays on each page of the touch panel **1**. It thus the touch panel **1** has a plurality of boundary components **11** according to the plurality of coordinate positions of the boundary location data I**2** by means of the location data storing component **3**. The display location data I**1** and the boundary location data I**2** may be relative to each other or not. The control means **4** includes a trace determining component **41** and a command publishing component **42**. The trace determining component **41** electrically connects with the touch panel **1** and the location data storing component **3**. The command publishing component **42** electrically connects with the trace determining component **41** and the output input means **2**.

[0037] In the process of operation, the touch panel **1** is provided for detecting a sliding trace L of a touching movement of a user's finger F (or a touch pen) (step S**10**), as shown in FIG. **4**. The trace determining component **41** distinguishes the sliding style of the sliding trace L that passes through the boundary component **11** or an edge potion **111** of the boundary component **11** for obtaining a determined result (step S**20**). And the command publishing component **42** sends a presetting command corresponding to the determined result to make the output input means **2** execute a presetting action according to the determined result (step S**30**).

[0038] In addition, in a preferred embodiment, in the step S**20**, it further includes a step of determining a direction of the sliding trace L passing through the boundary component **11** or a direction of the sliding trace L passing through the edge portion **111** of the boundary component **11** by a trace direction determining component **411** of the trace determining component **41**.

[0039] The present invention provides the pages displayed by the display component **21** for describing the control method of the present invention as follows.

[0040] Refer to FIG. **5**. The display component **21** displays a main page P**1** through the touch panel **1**. The main page P**1** has a key symbol S**1**, and the touch panel **1** has a boundary component **11** that is allocated and is corresponding to the key symbol S**1**. In this embodiment, the sliding trace L**1** does not completely pass through the boundary component **11**. The sliding trace L**1** only passes through the edge portion **111** of the boundary component **11**. In other words, an initial touching point T**1** of the sliding trace L**1** does not locate within the boundary component **11**, but an end touching point T**2** of the

sliding trace L1 does locate within the boundary component **11**. In this embodiment, the touch panel **1** detects the sliding trace L1 (step S**10**). The trace determining component **41** distinguishes that the sliding trace L1 passes through the edge portion **111** of the boundary component **11** (step S**20**). And the command publishing component **42** sends a presetting command according to the determined result of the trace determining component **41** to make the display component **21** of the output input means **2** execute a presetting action that unlocks the main page P1 (step S**30**). However, the present invention is not limited to that. Alternatively, the output input means **2** can execute the presetting action when the sliding trace L1 completely passes through the boundary component **11**. The output input means **2** also can execute the presetting action when the initial touching point T1 of the sliding trace L1 is located within the boundary component **11** and the end touching point T2 of the sliding trace L1 is not located within the boundary component **11**.

[0041] Refer to FIG. **6**. The display component **21** displays a multimedia playing page P2 through the touch panel **1**. The multimedia playing page P2 has a repeat playing symbol S2, a playing symbol S3, a stop playing symbol S4, a pause playing symbol S5. The display location data I1 defines the location of the repeat playing symbol S2, the location of the playing symbol S3, the location of the stop playing symbol S4, and the location of the pause playing symbol S5. The touch panel **1** has a plurality of boundary components **11** corresponding to a multimedia information and has a target area A2, A3, A4, A5 respectively corresponding to the repeat playing symbol S2, the playing symbol S3, the stop playing symbol S4, the pause playing symbol S5 according to the display location data I1. The target area A2, A3, A4, A5 respectively correspond to corresponding target actions that make an audio component **22** of the output input means **2** play repeatly, play, stop playing, and pause playing, respectively. In this embodiment, the touch panel **1** detects the sliding trace L2 (step S**10**). The trace determining component **41** distinguishes that the sliding trace L2 passes through the target area A2 and then passes through the edge portion **111** of the boundary component **11** (step S**20**). It further makes the audio component **22** execute a presetting action that plays music repeatly (step S**30**). The touch panel **1** detects the sliding trace L3 (step S**10**). The trace determining component **41** distinguishes that the sliding trace L3 passes through the edge portion **111** of the boundary component **11** and then passes through the target area A3 (step S**20**). It further makes the audio component **22** execute a presetting action that plays music (step S**30**). The touch panel **1** detects the sliding trace L4 (step S**10**). The trace determining component **41** distinguishes that a initial touching point T41 of the sliding trace L4 locates within the target area A4 and the sliding trace L4 passes through the edge portion **111** of the boundary component **11** (step S**20**). It further makes the audio component **22** execute a presetting action that stops playing music (step S**30**). The touch panel **1** detects the sliding trace L5 (step S**10**). The trace determining component **41** distinguishes that the sliding trace L5 passes through the edge portion **111** of the boundary component **11** and a end touching point T52 of the sliding trace L5 locates within the target area A5 (step S**20**). It further makes the audio component **22** execute a presetting action that pause playing music (step S**30**).

[0042] Refer to FIG. **7**. The display component **21** displays a keyboard inputting page P3 through the touch panel **1**. In this embodiment, the touch panel **1** has a boundary component **11** and target areas A6, A7, A8 that the boundary component **11** and the target areas A6, A7, A8 are hidden from view on the touch panel **1**. The touch panel **1** detects the sliding trace L6 (step S**10**). The trace determining component **41** distinguishes that the sliding trace L6 passes through the boundary component **11** and then slides over the target areas A6 (step S**20**). It makes the command publishing component **42** send a presetting command of changing page to make the display component **21** execute a presetting action that makes the page change as a secondary keyboard inputting page (step S**30**). The touch panel **1** detects the sliding trace L7 (step S**10**). The trace determining component **41** distinguishes that a initial touching point T71 of the sliding trace L7 locates within the target area A7 and the sliding trace L7 passes through the boundary component **11** (step S**20**). It makes the command publishing component **42** publish a presetting command of changing page to make the display component **21** execute a presetting action that makes the page change as a Chinese (or English) keyboard inputting page (step S**30**). The touch panel **1** detects the sliding trace L8 (step S**10**). The trace determining component **41** distinguishes that the sliding trace L8 passes through the boundary component **11** firstly and a end touching point T82 of the sliding trace L8 locates within the target area A8 (step S**20**). It makes the command publishing component **42** publish a presetting command of changing page to make the display component **21** execute a presetting action that makes the page change as a numeric (or symbol) keyboard inputting page (step S**30**).

[0043] Refer to FIG. **8**. The display component **21** displays a photography capturing page P4 through the touch panel **1**. In this embodiment, in the step S**20**, the trace direction determining component **411** determines a direction of the sliding trace passing through the boundary component **11**. In the step S**30**, the presetting action corresponds to the direction of the sliding trace passing through the boundary component **11**. For example, the sliding traces L9, L10, L11, L12 pass through the boundary component **11** with different directions respectively so that a camera component **23** of the output input means **2** executes a presetting action of recording, a presetting action of photographing, a presetting action of automatically photographing in a presetting time, and a presetting action of scene setting, respectively. Of course, the present invention is not limited to that, in the step S**20**, the trace direction determining component **411** also can determine a direction of the sliding trace passing through the edge portion **111** of the boundary component **11**. As shown in FIG. **9**, the display component **21** displays a signal transmitting page P5 through the touch panel **1**. In this embodiment, the boundary component **11** locates along the edge of the touch panel **1**. The sliding traces L13, L14, L15, L16 pass through the edge portion **111** of the boundary component **11** with different directions respectively so that a signal transmitting component **24** of the output input means **2** executes a presetting action of calling up, a presetting action of hanging up, a presetting action of switching connection, and a presetting action of holding, respectively.

[0044] Refer to FIG. **10**. The display component **21** displays a signal transmitting page P6 through the touch panel **1**. In this embodiment, the boundary component **11** has a plurality of subsidiary boundary components **112**, **113**. The subsidiary boundary components **112**, **113** respectively correspond to one of the target actions. In the step S**20**, the trace determining component **41** distinguishes that the sliding trace L17 passes through the subsidiary boundary components

112, and in the step S**30**, it makes the signal transmitting component **24** executes a presetting action of calling up. In the step S**20**, the trace determining component **41** distinguishes that the sliding trace L**18** passes through the subsidiary boundary components **113**, and in the step S**30**, it makes the signal transmitting component **24** executes a presetting action of hanging up.

[0045] Refer to FIG. **11**. The display component **21** displays a signal transmitting page P**7** through the touch panel **1**. In this embodiment, the boundary component **11** has a plurality of subsidiary boundary components **114**, **115**. A user uses both of the subsidiary boundary components **114**, **115** to correspond to an action of calling up. In the step S**20**, the trace determining component **41** distinguishes that the sliding trace L**19** passes through the subsidiary boundary components **114** and the sliding trace L**20** passes through the subsidiary boundary components **115**, so that the signal transmitting component **24** executes a presetting action of calling up (step S**30**).

[0046] Refer to FIG. **12**. The display component **21** displays a signal transmitting page P**8** through the touch panel **1**. In this embodiment, the touch panel **1** has a plurality of boundary components **12**, **13**, **14**. The boundary components **12**, **13** are overlapped with each other and are used together for corresponding to an action of calling up. In the step S**20**, the trace determining component **41** distinguishes that the sliding trace L**21** passes through both the boundary components **12**, **13**, so that the signal transmitting component **24** executes a presetting action of calling up in the step S**30**. The boundary components **12**, **14** overlapped with each other and are used for corresponding to an action of hanging up. In the step S**20**, the trace determining component **41** distinguishes that the sliding trace L**22** passes through both the boundary components **12**, **14**, so that the signal transmitting component **24** executes a presetting action of hanging up in the step S**30**.

[0047] Refer to FIG. **13**. The display component **21** displays a musical instrument playing page P**9** through the touch panel **1**. In this embodiment, the touch panel **1** has a plurality of boundary components **15**, **16** and a plurality of target areas A**9**, A**10**. In the step S**20**, the trace determining component **41** distinguishes that the sliding trace L**23** passes through the boundary component **15** and is nearest to the target area A**10**, so that the audio component **22** executes a presetting action to generate a guitar sound with tonic "Re" (step S**30**).

[0048] Refer to FIG. **14**. The display component **21** displays a keyboard inputting page P**10** through the touch panel **1**. In this embodiment, the keyboard inputting page P**10** is an English keyboard inputting page, and the touch panel **1** has a plurality of target areas A**11** . . . for inputting English characters. In this embodiment, in the step S**20**, while the trace determining component **41** distinguished that the sliding trace L**24** passes through the target areas A**11** that is an area printed with an English character "U", then a boundary component **17** is to be appeared on the keyboard inputting page P**10**. The boundary component **17** includes a plurality of region portions **171**, **172**, **173**, **174**, **175**. In this embodiment, while the sliding trace L**24** passes through the boundary component **17** and slides over the region portion **174**, then it executes the presetting action corresponding to the region portion **174**, that an English character "Ü" is inputted in a searching box **18** (step S**30**).

[0049] Of course, in addition to the shape of the boundary component **11**, **12**, **13**, **14**, **15**, **16**, **17** as mentioned above, the shape of the boundary component of the present invention also can be the shape selected from a group including frame-shaped form, strip-shaped form, and spot-shaped form, as shown in FIGS. **15**A-**15**L.

[0050] The above description should be considered as only the discussion of the preferred embodiments of the present invention. However, a person skilled in the art may make various modifications to the present invention. Those modifications still fall within the spirit and scope defined by the appended claims.

What is claimed is:

1. A control method of touch control device for controlling a touch control device, the touch control device is provided with a touch panel, the touch panel is provided with a boundary component, the control method comprising steps of:

(a) detecting a sliding trace of a touching movement on the touch panel;

(b) obtaining a determined result by distinguishing whether the sliding trace passes through the boundary component or not and by distinguishing whether the sliding trace passes through an edge portion of the boundary component or not; and

(c) executing a presetting action according to the determined result.

2. The control method as claimed in claim **1**, wherein the shape of the boundary component is a shape selected from a group including frame-shaped form, strip-shaped form, and spot-shaped form.

3. The control method as claimed in claim **1**, wherein the boundary component appears on the touch panel or is hidden from view on the touch panel.

4. The control method as claimed in claim **1**, wherein the touch panel is provided with a plurality of boundary components, at least two of the plurality of the boundary components are commonly used for corresponding to an execution action, and in the step (c) while the sliding trace is distinguished as having a trace be passing through a plurality of boundary components that commonly corresponding to an execution action, or the siding trace is distinguished as having a trace be passing through the edge portions of the plurality of boundary components that commonly corresponding to an execution action, then a presetting action that runs the execution action is executed.

5. The control method as claimed in claim **1**, wherein in the step (b), it further includes a step of determining a direction of the sliding trace that passes through the boundary component or a direction of the sliding trace that passes through the edge portion of the boundary component.

6. The control method as claimed in claim **1**, wherein the touch panel is provided with a target area, the target area corresponds to a corresponding target action, in the step (c) while the sliding trace is distinguished as having a trace be passing through the boundary component or through the edge portion of the boundary component, and the sliding trace is distinguished as having a trace be sliding over the target area, then a presetting action of the corresponding target action is executed.

7. The control method as claimed in claim **1**, wherein in the step (c), the presetting action is a corresponding target action that corresponds to a target area nearest to the sliding trace.

8. The control method as claimed in claim **1**, wherein the boundary component has a plurality of subsidiary boundary components, and each subsidiary boundary component corresponds to a corresponding target action respectively.

9. The control method as claimed in claim **1**, wherein the boundary component has a plurality of subsidiary boundary components, and at least two of the plurality of the subsidiary boundary components commonly used for corresponding to a co-corresponding action.

10. The control method as claimed in claim **1**, wherein the boundary component has a region portion, the region portion corresponds to a corresponding target action, in the step (c) while the sliding trace is distinguished as having a trace be passing through the boundary component or the edge portion of the boundary component, and the sliding trace is distinguished as having a trace be sliding over the region portion, then a presetting action of the corresponding target action is executed.

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