

pointing means **1303** is p'; in this case, a coordinate point is calculated as being q. However, in such a case, p and q are adjacent to each other; therefore, an error is very minute. On the other hand, the actual indicated position on the coordinate input plane **1301** by the pointing means **1303** is r, and a position shielded by the pointing means **1303** is r'; in this case, a coordinate point is calculated as being s. Therefore, an error considerably becomes large; for this reason, the detection accuracy is reduced in a predetermined area on the coordinate input plane **1301**.

[0013] If the light irradiated from the optical unit **1302** is far from the coordinate input plane **1101**, there is a problem that "unnecessary brush script" (called as "hane" in calligraphy serif" or "faintness" occurs in a locus drawn by the pointing means displayed on a display screen. **FIG. 15A** and **FIG. 15B** are views to explain the principle that the "unnecessary brush script" occurs, and **FIG. 16A** to **FIG. 16F** are views to explain the principle that the "faintness" occurs. As is evident from **FIG. 15A**, when light position is far from the coordinate input plane **1101**, the irradiation light is shielded until a finger contacts with the coordinate input plane **1101**; for this reason, as shown in **FIG. 15B**, the "unnecessary brush script" occurs in starting or ending the input.

[0014] Moreover, as shown in **FIG. 16A** to **FIG. 16F**, the finger all shields lights to be shielded until it contacts with the coordinate input plane **1101**, for this reason, the "faintness" occurs because it is difficult to set a detection threshold value.

[0015] In the prior art, in order to widen the coordinate input plane, sometimes two or more apparatuses for inputting coordinates are connected for performing a coordinate input. For this reason, there is a problem that a visibility becomes worse because the reflecting plate or the shielding plate on a joined portion becomes an obstacle depending upon viewing positions. More specifically, following problem arises when a plurality of apparatuses for inputting coordinates are used. For example, at a conference hall, in the case of attending a lecture from various positions, the reflecting plate or the shielding plate becomes an obstacle from listeners who are positioned at a low angle with respect to the coordinate input plane; for this reason, the visibility becomes worse.

#### SUMMARY OF THE INVENTION

[0016] It is an object of the present invention to provide an apparatus for inputting coordinates which is easy to operate. It is another object of the present invention to provide an apparatus for inputting coordinates which can detect the coordinates accurately. It is still another object of the present invention to provide an apparatus for inputting coordinates which can improve a visibility.

[0017] In the apparatus for inputting coordinates according to one aspect of the present invention, a light source section and a light receiving section are integrated to form one optical unit, and this optical unit is embedded in a coordinate input plate. As a result, it becomes possible to reduce a projection of the optical unit.

[0018] Further, height of the light, from the coordinate input plane, emitted by the light source is adjustable. Further, the height of the reflecting section, from the coordinate input plane, is adjustable. Further, this apparatus for input-

ting coordinates can be coupled another apparatus for inputting coordinates. Further, a plane including the coordinate input plane is interposed between the light source section and the light receiving section.

[0019] In the apparatus for inputting coordinates according to another aspect of the present invention, a pointing stick reflects the light. Furthermore, a light source section and a light receiving section are integrated to form one optical unit, and this optical unit is embedded in a coordinate input plate. As a result, it becomes possible to reduce a projection of the optical unit.

[0020] Further, an outlet of light with respect to the coordinate input plane, i.e. the emission light mouth, is provided with a shielding plate substantially parallel to the coordinate input plane. Further, height of the light, from the coordinate input plane, emitted by the light source is adjustable. Further, a shielding plate extending substantially vertical to the coordinate input plane at an outer edge of the coordinate input plane is provided. Further, height of the shielding plate, from the coordinate input plane, is adjustable. Further, the apparatus for inputting coordinates can be coupled with another apparatus for inputting coordinates.

[0021] Other objects and features of this invention will become apparent from the following description with reference to the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0022] **FIG. 1** is a view schematically showing a corner portion including an optical unit of an apparatus for inputting coordinates of the present invention;

[0023] **FIG. 2A** and **FIG. 2B** are views showing a corner cube reflector;

[0024] **FIG. 3A** and **FIG. 3B** are views schematically showing an internal structure of a light emitting section of an optical unit of the apparatus for inputting coordinates according to a first embodiment;

[0025] **FIG. 4** is a view schematically showing an internal structure of a light receiving section of the optical unit of the apparatus for inputting coordinates according to the first embodiment when viewing from a direction vertical to a coordinate input plane;

[0026] **FIG. 5** is a view schematically showing a construction of the apparatus for inputting coordinates according to the first embodiment;

[0027] **FIG. 6** is a view to explain one example of adjusting a height of a reflecting section of the apparatus for inputting coordinates according to the first embodiment;

[0028] **FIG. 7** is a view to explain one example of a joint member for joining a frame section of the apparatus for inputting coordinates according to the first embodiment to a frame section of another apparatus for inputting coordinates;

[0029] **FIG. 8A** and **FIG. 8B** are views showing another arrangement of the light emitting section and the light receiving section of the apparatus for inputting coordinates according to the first embodiment;

[0030] **FIG. 9A** and **FIG. 9B** are views schematically showing a corner portion including an optical unit of an apparatus for inputting coordinates of to a second embodiment;