[0031] **FIG. 10**A and **FIG. 10B** are views schematically showing an internal structure of the optical unit of the apparatus for inputting coordinates according to the second embodiment;

[0032] **FIG. 11** is a view to explain a shielding plate attached to the optical unit of the apparatus for inputting coordinates according to the second embodiment;

[0033] **FIG. 12**A and **FIG. 12B** are views schematically showing a corner portion including an optical unit of a conventional apparatus for inputting coordinates;

[0034] **FIG. 13**A and **FIG. 13B** are views schematically showing another conventional optical type apparatus for inputting coordinates;

[0035] **FIG. 14**A and **FIG. 14B** are views showing an area where a detection accuracy is reduced in the conventional optical type apparatus for inputting coordinates, and to explain the principle;

[0036] **FIG. 15**A and **FIG. 15B** are views to explain the principle that "unnecessary character locus" occurs in the case where an irradiation light portion is higher than a coordinate input plane in the conventional optical type apparatus for inputting coordinates; and

[0037] **FIG. 16A** to **FIG. 16F** are views to explain the principle that "faintness" occurs in the case where an irradiation light portion is higher than a coordinate input plane in the conventional optical type apparatus for inputting coordinates.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0038] Preferred embodiments of the present invention will be described below with reference to the accompanying drawings.

[0039] **FIG. 1**A and **FIG. 1B** are views schematically showing a corner portion including an optical unit of an apparatus for inputting coordinates of the present invention. **FIG. 1**A is a perspective view showing the apparatus for inputting coordinates, and **FIG. 1B** is a front view when viewing the optical unit from a light emitting plane. A corner cube reflector is given as one example of the above member. A apparatus for inputting coordinates **100** is composed of a coordinate input plane **101** for inputting a coordinate position, an optical unit **102**, a reflecting section **103**, a support plate **104** for fixing the coordinate input plane **101**, and a frame section **105** for reinforcing the support plate **104** and fixing the reflecting section **103**. More specifically, the optical unit **102** has a light emitting section which emits light that is substantially parallel to the coordinate input plane **101** and a light receiving section which receives the light traveling substantially parallel to the coordinate input plane **101**. The reflecting section **103** reflects the light emitted from the optical unit **102**.

[0040] In **FIG. 1**A and **FIG. 1**B, legend **106** denotes an emission light mouth which is an outlet of light from the optical unit **102**, and legend **107** denotes a screw for fixing the optical unit **102** to the frame section **105**. Moreover, legend **108** denotes a pointing stick for inputting a coordinate position on the coordinate input plane **101**. In this case, the point stick is used for shielding the light, and as shown in **FIG. 1**A, the coordinate position may be inputted by a finger or the like. The emission light mouth **106** is also an incident light mouth which is an inlet of light incident upon the optical unit **102**. A legend **109** denotes a height adjusting screw for adjusting a height of the optical unit **102**, and legend **110** denotes an optical unit retaining plate for retaining the optical unit.

[0041] The reflecting section **103** has a surface which is covered with a member recursively reflecting the light. A corner cube reflector is give as one example of the above member. **FIG. 2**A and **FIG. 2B** are views showing the corner cube reflector. **FIG. 2A** is a perspective view showing the corner cube reflector, and **FIG. 2B** is a cross sectional view in a straight line passing through the vertex and the center of circle of a base. The corner cube reflector has a conical shape, and its inner surface is aluminized so as to improve a reflection efficiency. As shown in **FIG. 2**B, the corner cube reflector recursively reflects an incident light because its conical angle is 90°.

[0042] The following is a description on the optical unit **102**. **FIG. 3**A and **FIG. 3B** are views schematically showing an internal structure of a light emitting section of the optical unit **102**. **FIG. 3A** is a view showing the light emitting section when viewing it from a direction (y-axis direction in **FIG. 3**A and **FIG. 3B**) perpendicular to a traveling direction of irradiation light in a plane parallel to the coordinate input plane **101**. **FIG. 3B** is a view showing the light emitting section when viewing it from a traveling direction of irradiation light direction (x-axis direction in **FIG. 3**A and **FIG. 3B**). The light emitting section **301** is composed of a light emitting element **302** emitting an irradiation light, cylindrical lenses **303**a to **303**c for deflecting the irradiation light emitted from the light emitting element to a predetermined direction, and a slit **304**. In this case, a half-silvered mirror **305** is a half mirror for reflecting the irradiation light passing through the slit **304** toward the reflecting section **103**.

[0043] For example, the light emitting element **302** comprises a laser diode, a pin-point LED or the like. The irradiation light emitted from the light emitting element **302** is converged by the cylindrical lens **303**a, and then, is formed as the light parallel to the z-axis (see **FIG. 3A**). Subsequently, the irradiation light passes through two cylindrical lenses **303**b and **303**c, and then, is converged to the y-axis direction, and thereafter, is collected to the slit **304** (see **FIG. 3B**). The slit **304** is formed with a long and thin micro clearance extending parallel to the x-axis, and thereby, the irradiation light is expanded like a sector in the y-axis direction. Namely, the slit **304** forms a so-called linear light source so as to improve a uniformity of the irradiation light.

[0044] **FIG. 4** is a view schematically showing an internal structure of a light receiving section of the optical unit **102** when viewing it from a direction vertical to the coordinate input plane **101**. For simplification of description, the following is a description on a detection of a reflection light in a two-dimensional plane parallel with the coordinate input plane **101**. The light receiving section **401** is composed of a light receiving lens **402** for converging (collecting) a reflection light reflected by the reflecting section **103**, and a line sensor **403** such as photo sensor, comprising a plurality of light receiving elements (optics) for sensing a receiving light intensity. Moreover, in **FIG. 4**, there are shown a light emitting element **302** and a half-silvered mirror **305**.

[0045] In this case, the light emitting element **302** is situated above the half-silvered mirror **305** (at a position of