free of noises and vibrations to achieve good detection accuracy with fewer failures and good durability, thus eliminating all of the conventional disadvantages.

[0015] However, in order to detect the light beam interruption position with good accuracy from the intensity distributions of the light beams received by the intensity distribution detection means, each of the light beams received by the light receiving surfaces of the above-described intensity distribution detection means is required to have its amount of light approximately uniformly distributed in a direction parallel to the surface of the touch panel and perpendicular to a traveling direction of the reflected light of the light beam traveling over the given region of the touch panel.

[0016] However, the distribution of the amount of light in a direction perpendicular to the optical axis of a light-emitting diode (LED) or a laser diode (LD) employed as a light source of each light emitting means, which distribution correlates to the intensity distribution of light emission, has a non-uniform characteristic that as indicated by a curve **51** shown in **FIG. 1**, the amount of light is maximized around a light source **50** and decreases in proportion to a distance therefrom.

[0017] Therefore, in the case of forming, by a combination of cylindrical lenses, the light beam into the parallel beam of the approximately uniform thickness in the direction perpendicular to the touch panel and into the sector shape in the direction parallel to the touch panel, the distribution of the amount of light in the direction parallel to the surface of the touch panel particularly has a characteristic that the amount of light is maximized at the center portion of the light beam and decreases as a measurement point of the amount of light approaches each end portion of the light beam.

[0018] Therefore, a light modulation plate **60** is disposed on an optical path of the light beam projected from each light emitting means to be received by each intensity distribution detection unit **70** so that the amount of light is modulated to be uniformly distributed in the direction parallel to the surface of the touch panel.

[0019] That is, as shown in **FIG. 1, a** light beam **55** projected from each light emitting means (not shown) to be reflected back from the retroreflective sheet is made incident on a condenser lens (image formation lens) **71** of the intensity distribution detection unit **70** through an opening portion **60***a* of the light modulation plate **60**. An image is formed, by the function of the condenser lens **71**, on a light receiving element array **72***b* formed by light receiving elements arranged in a linear array on a light receiving surface **72***a* of a CCD **72** that is an optical-electrical transducer so that the intensity distribution of the light beam **55** is detected.

[0020] The light modulation plate **60** is stamped out from a sheet metal to have its outer shape and the opening portion **60***a* formed. The opening portion **60***a* is a slit longitudinally narrow in a spreading direction of the light beam **55** parallel to the surface of the touch panel (in a right-to-left direction or a Y-axial direction in **FIG. 1**), and has its width d gradually varying so as to be the widest at both end portions thereof and the narrowest at the center thereof.

[0021] Therefore, if a light beam having its amount of light distributed uniformly all over the opening portion **60***a* in a longitudinal direction thereof is made incident on the opening portion **60***a*, the amount of light of the light beam passing through the light modulation plate **60** is distributed to be minimized at the center portion of the light beam and maximized at both end portions thereof, as indicated by a curve **52** shown in **FIG. 1**.

[0022] However, as described above, the distribution of the amount of light of the actual light source **50** has the characteristic indicated by the curve **51** of **FIG. 1**. Therefore, by passing through the light modulation plate **60**, the light beam can be modulated to have its amount of light distributed almost uniformly in the Y-axial direction as indicated by a broken curve **53** of **FIG. 1**.

[0023] The light beam **55** is made incident on the condenser lens **71** so as to be gathered at the center thereof in the Y-axial direction, and is laterally reversed to form the image on the light receiving element array **72***b* of the CCD **72** so that the intensity distribution of the light beam is detected. Accordingly, in this manner, an intensity distribution signal having an almost uniform level all over the light receiving element array **72***b* is usually detected.

[0024] Thus, by changing the shape of the opening portion **60***a* of the light modulation plate **60**, the incident light beam can be modulated to have a desired distribution of its amount of light. Therefore, the distribution of the amount of light of the light beam **55** in the Y-axial direction can be adjusted to the characteristic of the CCD **72**.

[0025] This requires a thickness D of the incident light beam **55** in a direction perpendicular to the surface of the touch panel to be thicker than a certain thickness, and the maximum value of the width d of the opening portion **60***a* of the light modulation plate **60** is determined based on the thickness D. If the maximum value of the width d is small, a variation in the width d is prevented from being great, thus narrowing a light modulation range. Therefore, the narrowed light modulation range, together with a limit to the dimensions of a metal mold for processing the sheet metal and a problem of processing accuracy, prevents a desired light modulation characteristic from being obtained.

[0026] However, in the above-described coordinate input and detection device, the thickness D of the sector-shaped light beam **55** projected over the surface of the touch panel is required to be as thin as possible to minimize a detectable region in the direction perpendicular to the surface of the touch panel so that a wrong detection based on an unnecessary interruption of the light beam other than an indication by means of a finger or an indication pen is prevented from being caused and that the detection accuracy of the coordinate value of a light beam interruption position is increased.

[0027] It is difficult to satisfy both of the above-described requirements. The above-described adjustment of the distribution of the amount of light of the light beam **55** incident on the light receiving surface **72***a* by means of the light modulation plate **60** is prevented from making sufficiently thin the thickness D of the light beam **55** in the direction perpendicular to the surface of the touch panel. Therefore, there remains the problem that a wrong detection based on an unnecessary interruption of the light beam other than an indication by means of a finger or an indication pen is caused or a sufficient detection accuracy of the coordinate value of a light beam interruption position is prevented from being obtained.