range between θ0 and θ1, and the reflected light does not enter the light receiving element **13***a* when the scanning angle is in the range between θ1 and θ2. Similarly, the reflected light does not enter the light receiving element **13***b* when the scanning angle is in the range between 0° and ϕ0, the reflected light enters the light receiving element **13***b* when the scanning angle is in the range between ϕ0 and ϕ1, and the reflected light does not enter the light receiving element **13***b* when the scanning angle is in the range between ϕ1 and ϕ2.

[**0063**] Such angles are calculated from the results of the comparison between the level of the light receiving signal and the threshold value Ref as shown in FIGS. **7**(*a*) and **7**(*b*), i.e., the timing of a rise or fall of the light receiving signal (see **FIGS. 8A and B**). Accordingly, the cut-off region by a person's finger as the indicator S can be calculated as dθ=θ2−θ1, and dϕ=ϕ2−ϕ1.

[**0064**] Here, needless to say, θ00 and ϕ00, and θ0 and ϕ0 are known from the positional relationship between the reference line connecting the light send/receive units **1***a* and **1***b* and the light receiving elements **13***a* and **13***b*, and the positional relationship between the reference line and the ends of the recurrence reflection sheet **7**.

[**0065**] Hence, in the optical scanning-type touch panel of the present invention, since the optical scanning cut-off region is calculated by varying the size of the threshold value Ref of the comparator **33***a* according to the optical scanning angle (the elapsed time from the start of optical scanning) and comparing the output of the light receiving element **13***a* (**13***b*) with this threshold value Ref, it is possible to eliminate the effect of the directly incident light on the light receiving element **13***a* (**13***b*) and calculate the accurate cut-off region.

[**0066**] Next, the following description will explain a process of calculating a coordinate of a central position (indicated position) of the indicator S (a finger in this example) from the cut-off region calculated in the above-mentioned manner. First, the conversion of an angle into an orthogonal coordinate based on the triangulation will be explained. As shown in **FIG. 9**, the position of the light send/receive unit **1***a* is set as an origin **0**, the right side and upper side of the display screen **10** are set as the X axis and Y axis, and the length of the reference line (the distance between the light send/receive units **1***a* and **1***b*) is set as L. Moreover, the position of the light send/receive unit **1***b* is set as B. When a central point P (Px, Py) on the display screen **10** indicated by the indicator S is positioned at angles of θ and ϕ with respect to the X axis from the light send/receive units **1***a* and **1***b*, the values of X coordinate Px and Y coordinate Py of the point P can be calculated according to the principle of the triangulation as given by equations (1) and (2) below, respectively.

$$Px=(\tan\phi)\div(\tan\theta+\tan\phi)\times L \tag{1}$$

$$Py=(\tan\theta\cdot\tan\phi)\div(\tan\theta\div\tan\phi)\times L \tag{2}$$

[**0069**] By the way, since the indicator S (finger) has a size, when the detecting angle for the timing of rise/fall of the detected light receiving signal is adopted, as shown in **FIG. 10**, four points (P1 through P4 in **FIG. 10**) of the edge portion of the indicator S (finger) are detected. These four points are all different from the indicated central point (Pc in **FIG. 10**). Thus, a coordinate (Pcx, Pcy) of the central point Pc is calculated as follows. If Px=Px (θ,, ϕ) and Py=Py (θ, ϕ), Pcx and Pcy can be given by equations (3) and (4) below.

$$Pcx=Pcs(\theta 1+d\theta/2,\ \phi 1+d\phi/2) \tag{3}$$

$$Pcy=Pcy(\theta 1+d\theta/2,\ \phi 1+d\phi/2) \tag{4}$$

[**0070**] Then, by substituting θ1+dθ/2 and ϕ1+dϕ/2 given by equations (3) and (4) for θ and ϕ in equations (1) and (2) above, the coordinate of the indicated central point Pc can be obtained.

[**0071**] In the above-mentioned example, the average value of the angle is calculated first and substituted in the triangulation converting equations (1) and (2) to calculate the coordinate of the central point Pc as the indicated position. However, it is also possible to calculate the coordinate of the central point Pc by first calculating the orthogonal coordinates of the four points **P1** through **P4** from the scanning angle according to the triangulation converting equations (1) and (2) and calculating the average of the calculated coordinate values of the four points. Moreover, considering parallax and easy viewing of the indicated position, the coordinate of the central point Pc as the indicated position can be determined.

[**0072**] By the way, as mentioned above, since the angular velocity of the rotation of the polygon mirrors **16***a* and **16***b* is constant, the information about the scanning angle is obtainable by measuring the time. **FIG. 11** is a timing chart showing the relationship between the light receiving signal from the light receiving signal detector **3***a* and the scanning angle θ and scanning time T of the polygon mirror **16***a*. When the angular velocity of the rotation of the polygon mirror **16***a* is constant, if the angular velocity of the rotation is represented by ω, a proportional relationship as given by equation (5) below is established between the scanning angle θ and the scanning time T.

$$\theta=\omega\times T \tag{5}$$

[**0073**] Therefore, the angles θ1 and θ2 at the time of the fall and rise of the light receiving signal establish the relationships given by equations (6) and (7) below with the scanning time t**1** and t**2**.

$$\theta 1=\omega\times t1 \tag{6}$$

$$\theta 2=\omega\times t2 \tag{7}$$

[**0074**] Thus, when the angular velocity of the rotation of the polygon mirrors **16***a* and **16***b* is constant, it is possible to measure the cut-off region and coordinate position of the indicator S (finger) by using the time information.

[**0075**] Moreover, in the optical scanning-type touch panel of the present invention, it is possible to calculate the size (the cross section length) of the indicator S (finger) from the measured cut-off region. **FIG. 12** is a schematic diagram showing the principle of measuring the cross section length. In **FIG. 12**, D1 and D2 are the cross section length of the indicator S when seen from the light send/receive units **1***a* and **1***b*, respectively. First, distances OPc (r**1**) and BPc (r**2**) from the positions O (0, 0) and B (L, 0) of the light send/receive units **1***a* and **1***b* to the central point (Pcx, Pcy) of the indicator S are calculated as given by equations (8) and (9) below.

$$OPc=r1=(Pcx^2+Pcy^2)^{1/2} \tag{8}$$

$$BPc=r2=\{(L-Pcs)^2+Pcy^2\}^{1/2} \tag{9}$$