[0069] 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 range calculated in the above-mentioned manner. First, conversion of an angle into an orthogonal coordinate based on the triangulation will be explained. As shown in **FIG. 18**, the position of the optical unit **1***a* is set as an origin O, 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 optical units **1***a* and **1***b*) is set as L. Moreover, the position of the optical unit **1***b* is set as B. When a central point P (Px, Py) indicated by the indicator S on the display screen **10** is positioned at angles of θ and ϕ with respect to the X-axis from the optical 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 shown by equations (2) and (3) below, respectively.

$$Px(\theta, \phi)=(\tan\phi)\div(\tan\theta+\tan\phi)\times L \tag{2}$$

$$Py(\theta, \phi)=(\tan\theta\cdot\tan\phi)\div(\tan\theta+\tan\phi)\times L \tag{3}$$

[0070] By the way, since the indicator S (finger) has dimensions, when the detection angle at the timing of rise/fall of the detected light receiving signal is adopted, as shown in **FIG. 19**, four points (P**1** through P**4** in **FIG. 19**) on the edge of the indicator S (finger) are detected. These four points are all different from the indicated central point (Pc in **FIG. 19**). Thus, a coordinate (Pcx, Pcy) of the central point Pc is calculated as follows. Pcx and Pcy can be expressed as shown by the following equations (4) and (5), respectively.

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

$$Pcy(\theta, \phi)=Pcy(\theta 1+d\theta/2, \phi 1+d\phi/2) \tag{5}$$

[0071] Then, by substituting θ**1**+dθ/2 and ϕ**1**+dϕ/2 expressed by equations (4) and (5) for θ and ϕ of equations (2) and (3) above, the coordinate of the indicated central point Pc can be obtained.

[0072] In the above-mentioned example, the average value of the angle is calculated first and then substituted into the converting equations (1) and (2) of triangulation 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 P**1** through P**4** from the scanning angle according to the converting equations (2) and (3) of triangulation and then calculating the average of the calculated coordinate values of the four points. Moreover, it is also possible to determine the coordinate of the central point Pc as the indicated position by considering parallax and easy viewing of the indicated position.

[0073] By the way, when the scanning angular velocity of the respective polygon mirrors **14** is constant, the information about the scanning angle is obtainable by measuring the time. **FIG. 20** 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 **14** in the optical unit **1***a*. When the scanning angular velocity of the polygon mirror **14** is constant, if the scanning angular velocity is represented by ω, a proportional relationship as shown by equation (6) below is established between the scanning angle θ and the scanning time T.

$$\theta=\omega\times T \tag{6}$$

[0074] Therefore, the angles θ**1** and θ**2** at the time of the fall and rise of the light receiving signal establish the relationships shown by equations (7) and (8) below with the scanning time t**1** and t**2**.

$$\theta 1=\omega\times t1 \tag{7}$$

$$\theta 2=\omega\times t2 \tag{8}$$

[0075] Thus, when the scanning angular velocity of the polygon mirrors **14** is constant, it is possible to measure the cut-off range and coordinate position of the indicator S (finger) by using the time information.

[0076] Moreover, in the optical scanning-type touch panel of the present invention, it is possible to calculate the size (the diameter of the cross section) of the indicator S (finger) from the measured cut-off range. **FIG. 21** is a schematic diagram showing the principle of measuring the diameter of the cross section of the indicator S. In **FIG. 21**, D**1** and D**2** represent diameters of cross sections of the indicator S seen from the optical 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 optical units **1***a* and **1***b* to the central point Pc (Pcx, Pcy) of the indicator S are calculated as shown by equations (9) and (10) below.

$$OPc=r1=(Pcx^2+Pcy^2)^{1/2} \tag{9}$$

$$BPc=r2=\{(L-Pcx)^2+Pcy^2\}^{1/2} \tag{10}$$

[0077] Since the radius of the cross section of the indicator S can be approximated by the product of the distance to the central point and sine of a half of the cut-off angle, the diameters D**1** and D**2** of the cross sections are measurable according to equations (11) and (12) below.

$$\begin{aligned} D1 &= 2\cdot r1\cdot\sin(d\theta/2) \\ &= 2(Pcx^2+Pcy^2)^{1/2}\cdot\sin(d\theta/2) \end{aligned} \tag{11}$$

$$\begin{aligned} D2 &= 2\cdot r2\cdot\sin(d\phi/2) \\ &= 2\{(L-Pcx)^2+Pcy^2\}^{1/2}\cdot\sin(d\phi/2) \end{aligned} \tag{12}$$

[0078] Further, when dθ/2, dϕ/2≈0, it is possible to approximate sin(dθ/2)≈dθ/2≈tan(dθ/2) and sin(dϕ/2)≈dϕ/2≈tan(dϕ/2), and therefore dθ/2 or tan(dθ/2), or dϕ/2 or tan(dϕ/2) may be substituted for sin(dθ/2) and sin(dϕ/2) in equations (11) and (12).

[0079] Besides, in the above example, while the aperture mirror **15** is used as the deflecting unit, any optical member having the light transmitting and light reflecting functions may be used, and, it is possible to use a half mirror, beam splitter, etc., for example.

Industrial Applicability

[0080] As described above, in the present invention, since the shape of the deflecting unit is asymmetrical in the scanning direction and/or the vertical direction about the optical axis, it is possible to enlarge the effective light receiving area for the scanning light and improve the light receiving signal level, thereby achieving a high SIN ratio.

[0081] Moreover, since the height of the deflecting unit is arranged to be the same as the height of the optical scanning unit, it is possible to eliminate an unnecessary light receiving