The invention relates to an optical scanning device, in which a light beam produced by a light source is directed by means of a semitransparent mirror onto a recording medium and reflected by the recording medium onto a photodetector, being transmitted through the semitransparent mirror, a transparent plate being arranged in the path of the light beam which is reflected by the recording medium between the semitransparent mirror and the photodetector and at a right angle to the semitransparent mirror.

A scanning device of this kind is used, for example, in a CD player in order to scan the recording medium, the so-called compact disc.

The structure of a known scanning device which operates according to the single- or three-beam method, for example, is reproduced in Figure 1.

The light beam of a laser L is deflected at a right angle by a semitransparent mirror HS onto the compact disc CD and focussed on the disc CD by means of an objective lens O. The light beam is reflected back by the disc CD through the objective lens to the semitransparent mirror HS, through which it is transmitted, and is then transmitted through a convex lens K, e.g. a plano-convex lens, to strike a four-quadrant photodetector PD. The four-quadrant photodetector PD is arranged at the focal point.

Since, however, in order to produce the data signal and the focus error signal, a circular patch of light on the four-quadrant photodetector is required, the convex lens K, which spreads the light beam, lies between the semitransparent mirror HS and the four-quadrant photodetector PD. A circular patch of light is therefore imaged on the four-quadrant photodetector at the focal point instead of a light spot.

A considerable disadvantage of this optical scanning device is entailed by the convex lens, for this is an expensive optical component which is relatively difficult to adjust

accurately, and this adjustment is absolutely necessary.

A further disadvantage lies in the fact that the semitransparent mirror HS causes misalignment of the beam.

The EP-A-0 198 655 discloses another optical scanning device in which a light beam produced by a light source is directed onto a recording medium by means of a semitransparent mirror. The light beam is reflected by the recording medium onto a photodetector, being transmitted through the semitransparent mirror. A transparent plate is arranged in the path of the light beam which is reflected by the recording medium between the semitransparent mirror and the photodetector and at a right angle to the semitransparent mirror.

A disadvantage of this optical scanning device lies in the fact that both the semitransparent mirror and the transparent plate have to be accurately adjusted in the beam path in order to ensure that the data is scanned.

The object of the invention is therefore to spread the light beam using the simplest means possible and at the same time simplify the adjustment operations for the optical components in an optical scanning device according to the preamble of claim 1.

This object is solved according to the invention by producing the semitransparent mirror and the plate as one part or securing the semitransparent mirror and the plate to one another.

The invention is firstly described and then explained on the basis of the embodiment illustrated in Figure 2.

As in the case of the known optical scanning device, the light beam produced by a laser L radiates onto a semitransparent mirror HS, which deflects the light beam at a right angle onto the compact disc CD. The light beam is

focussed on the disc CD by means of an objective lens O lying between the semitransparent mirror HS and the disc CD, from which disc it is reflected back to the semitransparent mirror HS. A glass plate P is secured to a front face of the semitransparent mirror HS, e.g. by means of adhesive, at a right angle to this mirror. The light beam reflected by the disc CD is transmitted through the objective lens O, through the semitransparent mirror HS and through the glass plate P to the four-quadrant photodetector PD.

The glass plate P, which is arranged at a right angle to the semitransparent mirror HS, spreads the light beam in the same way as a convex lens. However the glass plate provided according to the invention is considerably cheaper than that provided in the prior art.

A further advantage is obtained if either the glass plate P is secured to a front face of the semitransparent mirror HS or the semitransparent mirror HS is secured to a front face of the glass plate P. In this embodiment of the invention only one part - the arrangement consisting of the semitransparent mirror HS and the glass plate P - needs to be adjusted, while in contrast both the semitransparent mirror HS and the convex lens K have to be accurately adjusted in the prior art.

Moreover, if the semitransparent mirror HS and the glass plate have the same optical properties, undesirable beam misalignment is prevented. The plate P may also consist of plastic instead of glass.

In the preferred embodiment illustrated in Figure 2 the semitransparent mirror HS is secured to the front face of the glass plate P or the glass plate P is secured to the front face of the semitransparent mirror HS by adhesive.

The invention is suitable, for example, for optical scanning devices which scan the data of a recording medium by means of a light beam according to the single- or three-beam

method. Scanning devices of this kind are fitted in, for example, CD players, video disc players, DRAW disc players or magneto-optical recording and playback units.

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Claims

1. Optical scanning device, in which a light beam produced by a light source (L) is directed by means of a semitransparent mirror (HS) onto a recording medium (CD) and reflected by the recording medium (CD) onto a photodetector (PD), being transmitted through the semitransparent mirror (HS), a transparent plate (P) being arranged in the path of the light beam which is reflected by the recording medium (CD) between the semitransparent mirror (HS) and the photodetector (PD) and at a right angle to the semitransparent mirror (HS), characterised in that the semitransparent mirror (HS) and the plate (P) are produced as one part or that the semitransparent mirror (HS) and the plate (P) are secured to one another.

2. Optical scanning device according to claim 1, characterised in that the semitransparent mirror (HS) and the plate (P) are produced from the same material.

3. Optical scanning device according to claim 1 or 2, characterised in that the semitransparent mirror (HS) is secured to a front face of the plate (P) or the plate (P) is secured to a front face of the semitransparent mirror (HS).

4. Optical scanning device according to claim 1, 2 or 3, characterised in that the semitransparent mirror (HS) and the plate (P) are secured to one another by adhesive.

5. Optical scanning device according to one or more of the preceding claims, characterised in that the plate (P) is produced from glass or plastic.

6. Optical scanning device according to one or more of the preceding claims, characterised in that the semitransparent mirror (HS) and the plate (P) are of the same thickness.

7. Optical scanning device according to one or more of the preceding claims, characterised in that the semitransparent

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mirror (HS) and the plate (P) are produced from material having the same optical properties.

8. Optical scanning device according to one or more of the preceding claims, characterised in that the photodetector which is provided is a four-quadrant photodetector (PD), which lies at the focal point.