

The invention is based on a head cylinder for a recorder according to the preamble of claim 1. Such a head cylinder is known through DE-OS 36 04 238.

Such a head cylinder contains a marker ring in the form of a pot- or cup-shaped piece of Plexiglas with markings in the form of more or less broad black stripes printed on around its circumference. By means of scanning these stripes optoelectronically, short pulses of a relatively high frequency and longer pulses of a lower frequency are generated. Such pulses serve for the regulation of the rotational speed of the head cylinder, for generating head change-over pulses and for the electronic commutation of a brush-less direct current motor.

The markings on such a head cylinder must be printed onto the cylindrical piece of Plexiglas in an additional working step. Apart from that, a so-called "noisy effect" occurs which means the following: dust can accumulate on the Plexiglas sections forming the transparent areas between the black marks. This build-up of dust influences the light passing through during scanning and creates a noise in the pulse signal generated which can lead to malfunctions.

It is the object of the invention to simplify the manufacture for putting on the marks, to reduce the costs of the marker ring and to eliminate said noisy effect as far as possible.

This object is achieved by the invention specified in claim 1. Further advantageous developments of the invention are given in the subclaims.

Thus the invention consists in that the marker stripes are formed from opaque fins of differing widths projecting from the edge, which form window-like openings between them and at their ends remote from the edge are interconnected by

means of a circumferential ring.

The opaque sections of the known Plexiglas ring are, therefore, replaced by open windows. As there is, thus, no longer any material in these areas, the accumulation of dust is certainly avoided and, thereby, said noisy effect is eliminated. The printed black stripes on the known Plexiglas ring are replaced by the fins of opaque material. Thus, the working step for printing the black stripes is saved. Since not only the fins made from black plastic but also the window-like openings in between practically do not alter, there is no aging process, which might reduce the quality of the optical scanning. By means of the absolute opaqueness of the fins and the absolute, non-changing light-permeability of the window-like openings, a high light/dark dynamic is achieved which is also free of any aging effect.

The ring which connects together the ends of the narrow and broad fins has a special significance. If the fins projecting from the edge and running parallel to the axis have free ends, particularly with the narrow fins, this can lead to bending or distortion due to temperature or aging effects. As the pulses are derived from these fins, temporal errors would occur in the positions of the pulses. There is also the danger that individual fins would break off because of their small width. By means of the ring, which interconnects the otherwise free ends of the fins, good stability is guaranteed, even for the narrow fins. Distortion of the fins in the radial or circumferential direction is thus avoided. It is only through the combination of the opaque fins, the light-permeable window-like openings, bounded on all sides, and the ring connecting the fins, that creates a marker ring which has the aforementioned advantages and fulfils all requirements, in particular regarding stability and the accuracy of the pulses generated.

The invention will be explained in the following with reference to the drawing of an embodiment. Therein is shown:

- Fig. 1 a marker ring of a known head cylinder,
- Fig. 2 a perspective view of a marker ring constructed according to the invention, and
- Fig. 3 in principle, a cross-section through the ring according to Fig. 2.

In Fig. 1, the pot-shaped rotating part 2, made from Plexiglas, is attached to the rotating part 1 of a head cylinder. Marks in the form of narrow black lines 3 and marks in the form of broader black lines 4 are printed on the outer circumference of part 2. Scanning these marks optoelectronically generates short pulses of relatively high frequency from the lines 3 and longer pulses with lower frequency from the lines 4.

Fig. 2 shows a pot- or cup-shaped rotating part 5, the function of which corresponds roughly to that of part 2 in Fig. 1. However, the part 5 consists not of Plexiglas but rather of an opaque black plastic. The part 5 is attached via hub 6 to the rotating shaft of the head cylinder. The outer circumference edge of part 5 contains a continuous, opaque web 7. Projecting from web 7 are a multiplicity of fins 8 with a relatively narrow width of about 0.5 mm and some fins 9 with a greater width of about 3 mm. All fins 8, 9 finish at the other circumferential ring 10. The circumferential web 7, the narrow fins 8, the broad fins 9 and the circumferential ring 10 form a multiplicity of window-like openings 11 between them, through which the light beam of a photo-electric barrier can pass unhindered.

The function of the narrow fins 8 corresponds to that of the narrow stripes 3 in Fig. 1. However, the advantage consists in that the marks formed by the fins 8 do not have to be printed; rather, they are formed through the one-piece

injection moulded plastic part according to Fig. 2. The wide fins 9 have the function of the broad stripes 4 in Fig. 1. The window-like openings 11 correspond to the transparent sections between the stripes 3, 4 in Fig. 1. However, it is advantageous that in these regions, in contrast to Fig. 1, there is no material and, therefore, accumulations of dust cannot occur in these areas. The circumferential ring 10, in which fins 8, 9 finish and which, therefore, links the ends of these fins together, guarantees the necessary stability described, in particular for the narrow fins 8.

Figure 3 shows, in principle, the method of operation of the part 5 in Fig. 2 in the form of a cross-section taken at the level of the openings 11. There are three wide fins 9 provided at the angles of rotation 0° , 90° , 180° . This solution is advantageous because only through such an asymmetrical arrangement can the actual position of the part 5 and thus of the rotating part of the head cylinder be detected. With two fins 9 offset by 180° , the position would be undetermined by 180° . The scanning of the marks formed by fins 8, 9 is performed with a light source 12 and a photo-sensitive element 13. A pulse sequence is generated at the output 14 of a pulse shaper 15 by means of the optoelectronic scanning of the fins 8, 9. This sequence contains relatively short pulses 16 with high frequency, triggered by the narrow fins 8 and preferably serving for the regulation of the rotational speed of the head cylinder. The pulse sequence contains, in addition, relatively long pulses 17 with lower frequency and greater amplitude, generated by the wide fins 9 and preferably serving for a servo regulation or for generating switching pulses for a head change-over.

CLAIMS

1. A head cylinder for a recorder with a rotating cylinder part with a circumferential edge with a multiplicity of equidistant marker stripes of narrow width and a lesser number of marker stripes lying in between and of greater width for generating pulses for an electronic motor commutation and/or a servo regulation and/or a head change-over, **characterised in that** the marker stripes are formed by opaque fins (8, 9) of differing widths projecting from the edge (7) which form window-like openings (11) between them and the ends of which remote from the edge (7) are connected with each other by means of a circumferential ring (10).
2. A head cylinder according to claim 1, **characterised in that** three fins (9) are provided each spaced part by an angle of rotation of 90°.
3. A head cylinder according to claim 1, **characterised in that** the rotating cylinder part (1) has a pot- or cup-shaped part (5), in the flat, circumferential edge of which, the plane of which is roughly parallel to the axis of rotation, the fins (8, 9) are provided.
4. A head cylinder according to claim 4, **characterised in that** the pot- or cup-shaped part (5) with the edge (7), the fins (8, 9) and the ring (10) are formed as a one-piece plastic injection moulding.