Comments.

(1) The type of the apparatus.

In general, the type of the apparatus is not particularly specified. However, the present invention relates to the apparatus of the embedded (sector) servo type. (Refer to Sketch 1 enclosed with this letter. As shown in Sketch 1, since the position area and the data area are on the same track, the apparatus is classified to the embedded servo type.) Please refer also to Page 1, Line 2 of the "Background of the Invention" of the present specification.

(2) Definition of "amplitude detection".

We explain the difference between the phase detection and the phase detection method. Next, we explain the difference regarding the case that the recording pitch of the burst pattern is made to 2/3. Please refer to Figures enclosed with this letter.

Explanation on the detection method.

In the phase detection of the References cited by the Examiner, the phase difference (Δt) between the two burst signals A and B is measured, so that the phase difference corresponds to the position. The relative phase between A and B is changed according to the position of the head. Refer to Sketch 1.

In the amplitude detection, the amplitude difference between the burst patterns corresponding to each other (A and B, or C and D in Sketch 2) corresponds to the position. Such is adopted by many makers. Refer to the prior arts.

The amplitude of the burst is changed according to the position of the head. (Refer to Sketch 3A.)

The two phases of such the method means the two position detection signals of (A,B) and (C,D). Regarding the relation between the values and positions of such the signals, there exists the complementary relation in (A,B) and (C,D) as shown in Sketch 3B.

The problem caused by 2/3 of the recording pitch.

In the phase detection as shown in Sketch 4, the burst portions (A,B) are made smoother as compared with Sketch 1. Independently of the width etc. of the Gray-Code, the smoothness of the burst can be improved.

(In the phase detection of the References, when the servo pattern is made smaller than the track pitch, it is not necessary to change the width of the Gray-Code, since there arises no problem regarding the improvement of the linearity.)

On the other hand, in the amplitude detection, the periods of (A,B) and (C,D) regarding the position of the head are made smaller (shorter), so that the relation between the Cray-Code and the period is lost. (Refer to Sketch 5.)

For solving such the problem, if the number of the phases is increased (Sketch 6), the apparatus of the embodiment can be constituted by keeping the corresponding relation between the Gray-Code width and the track pitch of the prior art apparatus. (Such the constitution corresponds to the 2/3 pitch pattern of the phase detection shown in Sketch 4.)

For eliminating the problem regarding the increase of the regions, the burst detection portions and so on and which is caused by adding the burst patterns E and F, the one to one relation of the patterns is destroyed by changing the widths of the Gray-Code and the burst portion to 2/3 and 1/2 of the track pitch, so that linearity can be improved without causing such the problem.

(3) Comment regarding "precision at the positioning".

The Examiner indicates the comment regarding "precision at the positioning" is not clear.

The description of the comment regarding "precision at the positioning is not suitable. You may amend or supplement the description of the comment by the following.

In the phase detection of the References, no technical merit is attained by making the track detection region narrower at all. Namely, if the track detection region is made narrower, the system becomes complicated.

(4) Comment regarding "plurality of phases".

It is preferrable to amend "plurality of phases" to --multiphase--.