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Yamada

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(54) **IMAGING OPTICAL SYSTEM, IMAGING OPTICAL DEVICE, AND DIGITAL APPARATUS**

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CPC **G02B 15/173** (2013.01); **G02B 9/64** (2013.01); **G02B 13/006** (2013.01)

(58) **Field of Classification Search**
CPC **G02B 15/173**; **G02B 13/006**; **G02B 9/12**; **G02B 9/14**
See application file for complete search history.

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(57) **ABSTRACT**

An imaging optical system includes first to third lens groups, and performs focusing by moving the second lens group, to satisfy the following conditional expressions:

$$0.8 < 1Gr_F/FL < 1.2,$$

$$0.6 < |2Gr_F/FL| < 2.5,$$

$$0.6 < 3Gr_F/FL < 1.8$$

$$0.8 < 1Gr_R_nop/1Gr_Thi < 1.1, \text{ and}$$

$$-0.6 < 2Gr_R_nop/2Gr_Thi < 1.6$$

where FL, 1Gr_Fl, 2Gr_Fl, and 3Gr_Fl represent focal lengths of the entire system, and the first to third lens groups, respectively, 1Gr_R_nop represents a distance from the outermost surface of the first lens group on the object side to a rear principal point of the first lens group, 1Gr_Thi represents a total length of the first lens group, 2Gr_R_nop represents a distance from the outermost surface of the second lens group on the object side to a rear principal point of the second lens group, and 2Gr_Thi represents a total length of the second lens group.

10 Claims, 21 Drawing Sheets

EX1-POS1

