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(71) Applicant: **Nidek Co., Ltd.**
Gamagori-shi
Aichi (JP)

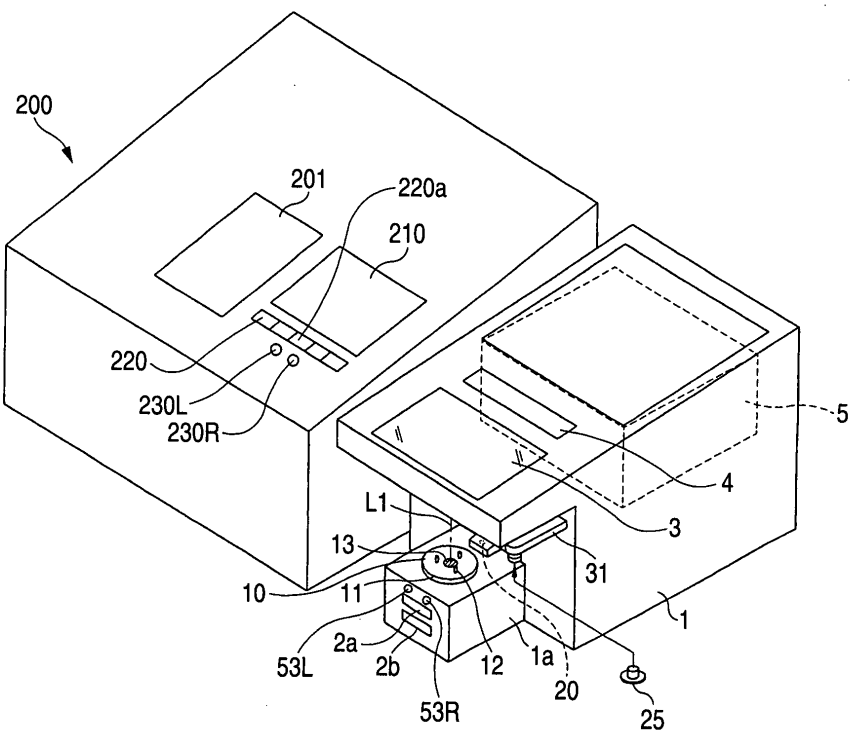
(72) Inventor: **Shibata, Ryoji**
Gamagori-shi
Aichi (JP)

(74) Representative: **Schaeberle, Steffen**
Hoefer & Partner
Patentanwälte
Pilgersheimer Strasse 20
81543 München (DE)

(54) Eyeglass lens processing apparatus

(57) An eyeglass lens processing apparatus for processing a peripheral edge of an eyeglass lens, includes: data inputting means for inputting a target lens shape data and a layout data; a cup for a left eye and a cup for a right eye to which identifying information for identifying the cup for the left eye and the cup for the right eye, which can be visually identified by a processor, is applied; and displaying means for displaying identifying information the same as the identifying information applied to the cup for the left eye or the right eye based on data inputted to the data inputting means.

FIG. 1



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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to an eyeglass lens processing apparatus for processing a peripheral edge of an eyeglass lens.

[0002] According to an eyeglass lens processing apparatus, a lens held (chucked) by lens chucks is rough-processed by a roughing grindstone. Thereafter, the lens is finished to process by a finishing grindstone (refer to, for example, USP6283826 (JP-A-11-333684).). When the lens is held by lens chucks, a base portion of a cup fixed to a surface of the lens is mounted to a cup holder provided to the lens chuck. Further, another chuck is moved to a side of the lens to hold the lens. Further, the cup is attached to an optical center of the lens or a geometrical center of a target lens shape by a cup attaching apparatus (refer to, for example, USP6798501 (JP-A-2001-62688)). The cup attaching apparatus is also referred to as a blocker.

[0003] Meanwhile, in processing the lens, when powers (spherical power, cylindrical power, axial angle) of left and right lenses differ from each other, it is important to process the lenses without mistaking the left and the right lenses. Therefore, an operator (processor) pays close attention so as not to mistake the left and right lenses. In correspondence therewith, marks or the like for identifying the left and right lenses are marked on surfaces of the lenses by a pen or the like.

Further, there is also proposed a cup capable of identifying left and right lenses by a cup having a difference in presence/absence of forming a recess portion or a hole at a base portion of the cup (refer to, for example, JP-A-8-252754).

[0004] However, according to the method of marking the mark or the like by the pen on the surfaces of the lenses, an operation of marking a mark and an operation of erasing the mark are needed. The operations take time and labor for the operator. Further, in a case of a lens coated by a water-repellant coating, a mark cannot be applied thereto.

The method of identifying the lenses by forming the recess portion or the hole at the base portion of the cup, shapes of the left and right cups cannot significantly be changed. Therefore, the recess portion or the hole is small, and therefore, the identification is not facilitated at a glance.

SUMMARY OF THE INVENTION

[0005] It is a technical object of the invention to provide an eyeglass lens processing apparatus capable of further reducing a mistake of left and right glasses.

[0006] In order to achieve the above object, the present invention is characterized by having the following arrangement.

(1) An eyeglass lens processing apparatus for processing a peripheral edge of an eyeglass lens, comprising:

data inputting means for inputting a target lens shape data and a layout data;
a cup for a left eye and a cup for a right eye to which identifying information for identifying the cup for the left eye and the cup for the right eye, which can be visually identified by a processor, is applied; and
displaying means for displaying identifying information the same as the identifying information applied to the cup for the left eye or the right eye based on data inputted to the data inputting means.

(2) The eyeglass lens processing apparatus according to (1) further comprising a cup attaching apparatus for attaching, to the eyeglass lens, the cup constituting an auxiliary piece for attaching the eyeglass lens to the eyeglass lens processing apparatus,
wherein the cup attaching apparatus includes left and right selecting means for selecting whether the lens attached to the cup is for the left eye or for the right eye, and displaying means for displaying identifying information the same as the identifying information applied to the cup for the left eye or the right eye selected by the left and right selecting means.

(3) The eyeglass lens processing apparatus according to (1), wherein the identifying information identified visually by the processor is applied at least to a flange portion.

(4) The eyeglass lens processing apparatus according to (1), wherein the identifying information identified visually by the processor is color information.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007]

Fig.1 is a view for explaining an overview of an eyeglass lens processing apparatus and a cup attaching apparatus;
Fig. 2 is a view for explaining an optical system, a blocking mechanism portion and a control system arranged at a cup attaching apparatus;
Fig.3 is a view for explaining an inner portion of an eyeglass lens processing apparatus;
Fig.4 is a diagram for explaining a control system of a processing apparatus;
Fig.5 is a view for explaining a cup;
Fig.6 is a view for explaining a cup holder provided to a lens chuck;
Fig.7 is a view for explaining an input screen of a cup attaching apparatus; and

Fig.8 is a view for explaining an input screen of a processing apparatus.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0008] An embodiment of the invention will be explained in reference to the drawings as follows. Fig. 1 shows an overview of an eyeglass lens processing apparatus and a cup attaching apparatus according to the invention.

<Cup attaching apparatus>

[0009] A constitution of a cup attaching apparatus 1 will be explained in reference to Fig. 1 and Fig. 2. Fig. 2 shows an optical system, a blocking mechanism portion and a control system arranged at the apparatus 1.

[0010] A base 1a is disposed on a lower side of the apparatus 1. An upper surface of the base 1a is attached with a lens table 10 made of transparent acrylic resin in a circular shape by way of a ring member 11. 3 pieces of support pins 12 are provided above the lens table 10 centering on a reference axis L1 of attaching a cup at equal intervals for supporting a lens LE.

[0011] A front surface of the base 1a is arranged with a switch 2a for operating a blocking mechanism portion 30 (mentioned later). Further, the front surface is arranged with a switch 2b for selecting left and right lenses. A pertinent space is ensured between a lower surface of an upper portion 1b projected to a front side of the apparatus 1 and the base 1a. The space is for the operator to hold the lens LE by the hand to move on the lens table 10 and for a cup 25 attached to a front end of a cup attaching arm 31 to be able to move up and down.

[0012] The apparatus 1 is provided with a detection optical system 9 for illuminating the lens LE, for detecting an optical center and an axial angle or the like of the lens LE. A constitution of the detection optical system 9 will be shown as follows.

[0013] An illumination light source 20 is arranged on a rear side of a vicinity of the lens table 10. A concave mirror 21 is provided with a mirror curved face for shaping illuminating light from the illumination light source 20 into a substantially parallel light flux having a diameter one size larger than that of the lens LE. Further, the substantially parallel light flux is projected along the reference axis L1.

[0014] A center of the lens table 10 is formed with an index portion 13 having a predetermined pattern centering on the reference axis L1. The index portion 13 comprises dot indexes arranged in a lattice-like shape. The dot index has a size of a diameter of 0.3mm. Further, the indexes are arranged at a pitch interval of 0.3mm in a range of 20mm square centering on the reference axis L1. A lower side of the lens table 10 is arranged with a screen plate 14 made by a semitransparent material of frosted glass or the like. A light flux transmitting through the lens LE illuminates the index portion 13 on the table 5. A total image of the lens LE and a dot index image subjected to prism operation of the lens LE are projected onto the screen plate 14. Further, a mirror 15 is arranged on a lower side of the screen plate 14. Further, a first CCD camera 17 is arranged on a lower side of the screen plate 14. The first CCD camera 17 is provided with a lens for taking an image by enlarging only a center region centering on the reference axis L1 to be able to detect the index image projected to the screen plate 14. A half mirror 16 is arranged on an optical path between the mirror 15 and the first CCD camera 17. Further, a second CCD camera 18 is provided in a reflecting direction of the mirror 16. The second CCD camera 18 is provided with a lens for taking a total image of the lens LE projected to the screen plate 14.

[0015] An explanation will be given of a method of calculating an optical center position and an axial angle of the lens LE from the image of the dot index image provided by the first CCD camera 17. When the lens LE is not mounted, the dot index of the index portion 13 is illuminated by a parallel light flux. Therefore, the index image is projected to the screen plate 14 as it is. When the lens LE having refracting power is mounted, a position of the dot image disposed right below the vicinity of the optical center of the lens LE stays the same regardless of presence/absence of the lens LE. However, a coordinate position of the dot image of a portion which is not disposed at the optical center of the lens LE is moved by a prism operation. Therefore, in order to detect the optical center, a change in the coordinate position of each dot image in the state of mounting the lens LE is grasped relative to the coordinate position of each dot image in a state of absence of the lens LE. It is calculated to which position each dot image is diverged or converged centering thereon. The center of diverging or converging constitutes the optical center.

[0016] Further, when the lens LE is provided with an astigmatism degree, each dot image is moved in a direction of being proximate to (or a direction of being remote from) a generatrix of the lens. Therefore, the axial angle is detected by investigating in which direction each dot image is moved relative to the coordinate position of each dot image in the state of absence of the lens LE.

[0017] In Fig. 2, the blocking mechanism portion 30 includes the arm 31 arranged with a cup holder 31a mounted with a base portion of a cup 25, a Y axis direction moving unit 32 for moving the arm 31 in Y axis direction (refer to Fig.2), a Z axis direction moving unit 34 for moving the arm 31 in an up and down direction (Z axis direction) along with the unit 32, and an X axis direction moving unit 36 for moving the arm 31 in a left and right direction (X axis direction) relative to a front surface of the apparatus 1 along with the unit 34. The moving units 32, 34, and 36 can be constituted by well-known moving mechanisms respectively having slide mechanisms and motors and the like. The cup holder 31a is attached to the arm 31 rotatably centering on an axis extended in an up and down direction. The Y axis direction moving unit 32

is arranged with a drive unit 38 arranged with a motor for rotating the cup holder 31a. A drive force of rotation of the drive unit 38 is transmitted to the cup holder 31a by way of a rotation transmitting mechanism (constituted by a gear, a rotating shaft and the like) arranged at inside of the arm 31. By rotating the cup holder 31a centering on the up and down shaft, an angle of the cup 25 is adjusted in accordance with an astigmatism viewing angle of the lens LE.

[0018] The rear side of the apparatus 1 is arranged with an eyeglass frame shape measuring unit 5. An upper surface of the apparatus 1 is arranged with a color liquid crystal display 3 for displaying a lens image taken by the second CCD camera 18 and various information. Furthermore, an operation switch portion 4 of the unit 5 is also arranged to the surface. The display 3 is provided with a touch panel function.

[0019] The unit 5, the display 3, the CCD cameras 17 and 18 and the like are connected to a control portion 50. The control portion 50 calculates the optical center position and the axial angle of the lens LE based on an output signal from the CCD camera 17. Furthermore, the control portion 50 controls to drive respective units and display the display 3 or the like.

<eyeglass lens processing apparatus>

[0020] A constitution of an eyeglass lens processing apparatus 200 will be explained in reference to Fig.1 and Fig.3. Fig.3 shows a processing mechanism at inside of the apparatus.

[0021] A carriage portion 100 is mounted on a base 170. Further, the processed lens LE is chucked by lens chucks 102L, 102R provided to a carriage 101 constituting the carriage portion 100. A peripheral edge of the lens LE is processed by controlling distances of the chucks 102L, 102R relative to a grindstone group 162 attached to a grindstone spindle 161 and rotated by a motor 160. The grindstone group 162 is constituted by a roughing grindstone for plastic 162a, a bevel-finishing and plane-finishing grindstone 162b and a polishing-finishing grindstone 162c, a roughing grindstone for glass 162d.

[0022] The lens chuck shaft 102L is held by a left arm 101L of the carriage 101 and the lens chuck 102R is held by a right arm 101R respectively rotatably and coaxially. The lens chuck shaft 102R is moved to a side of the lens chuck 102L by a motor 110 attached to the right arm 101R. Further, the lens LE is held by two of the lens chucks 102R, 102L. Further, the two lens chucks 102R, 102L are rotated by a motor 120 attached to the left arm 101L by way of a rotation transmitting mechanism of a gear or the like in synchronism with each other. A front end side of the lens chuck shaft 102L is fixed with a cup holder 130 mounted with a base portion 25a of the cup 25. A front end side of the lens chuck 102R is fixed with a lens holding member 135 brought into contact with a back surface of the lens LE (refer to Fig. 6) .

[0023] The carriage 101 is mounted on an X-axis moving support base 140 along shafts 103, 104 extended in parallel with the grindstone spindle 161. A back portion of the support base 140 is attached with a ball screw extended in parallel with the shaft 103 (not illustrated). The ball screw is attached to a rotating shaft of an X-axis moving motor 145. Further, the carriage 101 is moved in an X-axis direction along with the support base 140 by rotating the motor 145.

[0024] Further, the support base 140 is fixed with shafts 156, 157 extended in a Y-axis direction (a direction of varying distances between axes of the lens chucks 102R, 102L and the grindstone spindle 161). The carriage 101 is mounted on the support base 140 along the shafts 156, 157 movably in the Y-axis direction. The support base 140 is fixed with a Y-axis moving motor 150. Rotation of the motor 150 is transmitted to a ball screw 155 extended in the Y-axis direction. Further, the carriage 101 is moved in the Y-axis direction by rotating the ball screw 155.

[0025] In Fig.3, this side of the processing apparatus 200 is arranged with a chamfering mechanism portion 180. An upper side of the carriage 101 is provided with edge path position measuring portions (lens shape measuring portions) 300F, 300R. A rear side of the carriage portion 100 is arranged with a boring and grooving mechanism portion 190. Well-known constitutions thereof are used. Therefore, an explanation thereof will be omitted here.

[0026] In Fig.1, an upper surface of the processing apparatus 200 is arranged with a color display 210 having a touch panel function, an operation switch panel 220, LED 230R of red color and LED 230L of green color as displaying means for displaying information of identifying left and right lenses. A door 201 is arranged at the upper surface of the processing apparatus 1.

[0027] Fig.4 is a block diagram for explaining a control system of the processing apparatus 200. A control portion 250 is connected with the display 210, the panel 220, LEDs 230R and 230L and the like. Further, the cup attaching apparatus 1 is connected to the control portion 250. Thereby, data are transmitted and received between the cup attaching apparatus 1 and the processing apparatus 200.

<lens fixing cup>

[0028] Fig.5 is a view for explaining the cup 25 as a jig fixed to the lens LE. Fig.6 is a view for explaining a constitution of the cup holder 130 provided with the lens chuck shaft 102L and fitting the cup 25 to the holder 130.

[0029] The cup 25 is used by being differentiated to a cup 25R fixed to a lens for the right eye and a cup 25L fixed to a lens for the left eye. Although shapes of the cup 25R and the cup 25L are the same, colors applied thereto differ from each other in order to identify left and right lenses at a glance. Therefore, in Fig. 5 and Fig. 6, the same notations are attached to constituent elements

of the cup 25R and the cup 25L. The cups 25R, 25L each is provided with the base portion 25a inserted into an inserting hole 131a of the cup holder 130 and a flange 26. The base portion 25a is formed with a key groove 25b. Further, the key groove 25b is fitted to a key 131b formed at the inserting hole 131a. Thereby, an angle of the chuck 102L (102R) relative to the lens LE can be maintained constant. Further, the base portion 25a is formed with a notch 25c for determining a position in an up and down direction of the lens. The flange 26 is formed with a recessed and projected portion 26a around the base portion 25a in order to alleviate a shift in a rotational direction relative to the cup holder 130. In accordance therewith, also an end portion of the cup holder 130 is formed with a recessed and projected portion fitted to the recessed and projected portion 26a. After mounting the base portion 25a of the cup 25R or 25L fixed with the lens LE to the cup holder 130, by moving the lens chuck 102R to the side of the lens LE, the lens holding member 135 is brought into contact with a rear surface of the lens. Thereby, the lens LE is held by the two lens chucks 102R, 102L.

[0030] Further, also the cup holder 31a provided at the cup attaching apparatus 1 is formed with an inserting hole and a key similar to the cup holder 130. Shapes thereof are similar to those of the cup holder 130, and therefore, an explanation thereof will be omitted.

[0031] With regard to different colors applied to the cup 25R and the cup 25L, it is preferable that a difference therebetween is easy to visually understand. According to the embodiment, the whole cup 25R is formed by red color and the whole cup 25L is formed by green color. In a case of integrally molding the cups 25R, 25L by a resin, when a material of the resin is mixed with colorants of red color and green color respectively, the different colors can simply be applied to the whole thereof. Further, the colors may be applied thereto after molding the cup. Further, with regard to portions of applying the colors, it is preferable to apply the colors to totals of the cups 25R, 25L, which are easy to identify for viewing eyes. However, the colors may be applied thereto partially. When the colors are attached thereto partially, it is preferable to apply the colors to, for example, the flange portion 26 which is provided with a wide area and is easy to identify.

[0032] Further, according to the embodiment, the flange portion 26 is provided with a size larger than a diameter of the cup holder 130 (31a). In this case, even after the base portion 25a is mounted to the cup holder 130 (31a), the flange portion 26 is exposed to outside. Therefore, an operator can easily identify a difference of colors. An end portion of the flange portion 26 is formed by a thickness of about 2mm. Therefore, when the colors are applied in a thickness direction (side surface) of the flange portion 26, the colors can easily be confirmed from the side surface even after mounting the cups 25R, 25L to the cup holder 130 (31a).

[0033] Next, an explanation will be given of operation of the cup attaching apparatus 1 and the processing apparatus 200 using the above-described cups 25R, 25L. First, an explanation will be given of operation of fixing the cups 25R, 25L respectively to left and right lenses by the cup attaching apparatus 1.

[0034] A target lens shape data measured by the eyeglass frame shape measuring unit 5 is stored to a memory 6. The display 3 is displayed with an input screen as shown by Fig. 7 . The screen displays that it is necessary to input an operation number (JOB number) for controlling a pair of left and right lenses LE. Further, an operator inputs the operation number by operating a numerical keypad displayed by depressing an operation number input column 61. Further, by operating respective keys of a processing condition selecting column 62, processing conditions of a material of a lens, a kind of a lens (monofocal lens, bifocal lens or the like), a processing mode and the like are inputted. A layout data can be inputted by operating respective keys of a layout input column 65. The target lens shape data, the processing conditions and the like are stored to the memory 51 in relation to the operation number.

[0035] Further, the operator selects which of left and right lenses the lens LE is by left and right selecting keys 63R, 63L. The left and right lenses can be selected also by the switch 2b. Here, an explanation will be given of a case of selecting a lens for the right eye. At this occasion, a display area of the key 63R is displayed by red color of the same color (including also a case of approximate color) in correspondence with red color applied to the cup 25R by the control portion 50 based on a selection signal. The key 63L on a side of not being selected is displayed by a color the same as that of a background of a layout screen 64. On the other hand, when a lens for the left eye is selected, by the control portion 50, a display area of the key 63L is displayed by green color of the same color (including also a case of approximate color) in correspondence with green color applied to the cup 25L. In this way, the display areas of the key 63R and the key 63L on the display 3 are used as left and right displaying means for displaying information of identifying left and right lenses by colors in correspondence with the cups 25R, 25L. The operator confirms a corresponding relationship between the display colors of the keys 63R, 63L and the colors of the cups 25R, 25L. Further, when the glass for the right eye is selected, the cup 25R of red color is attached to the cup holder 31a. Further, when the glass for the left eye is selected, the cup 25L of green color is attached to the cup holder 31a.

[0036] Further, the color is applied also to the portion of the flange portion 26. Therefore, the color of the flange portion 26 can optically be confirmed even after mounting the cup 25R or 25L to the cup holder 31a. Further, by the corresponding relationship with the display colors for identifying left and right lenses of the display 210, it can easily be confirmed which of left and right cups 25R and 25L is mounted to the holder 31a.

[0037] Further, means for displaying the information of identifying left and right glasses by colors in corre-

spondence with colors of left and right cups is not limited to means for changing the display colors of the key 63R and the key 63L. For example, there may be adopted also a method of totally or partially changing the color of the background displayed on the display 3. The background of the layout screen 64 may be displayed by red color when the lens for the right eye is selected and displayed by green color when the lens for the left eye is selected. By displaying the color in correspondence with the color of the selected cup by a wide area, a situation of selecting left and right lenses becomes visually easy to grasp. Further, the display of the information of identifying left and right lenses in correspondence with the colors of the cups is not limited to the display of the display 3. Other display may be provided. For example, LED 53R of red color and LED 53L of green color may be arranged at vicinities of the switches 2a, 2b. When the lens for the right eye is selected, LED 53R of red color is lighted in correspondence with a selecting signal. Further, when the lens for the left eye is selected, LED 53L of green color is lighted in correspondence with a selecting signal thereof.

[0038] Inputting a layout data will be explained. The operator can input the layout data of FED (frame pupillary distance), PD (pupillary distance), a height of an optical center of a lens relative to a geometrical center of a target lens shape and the like. Further, an astigmatism axis angle of a prescription data of the lens LE can be inputted. Further, it can be selected whether a block center of a lens is an optical center or a frame center (geometrical center of a target lens shape).

[0039] Attaching cups to the left and right lenses LE will be explained. For example, an explanation will be given of a case of selecting the lens for the left eye by the key 63L. First, the operator mounts a center portion of the lens LE for the left eye at a vicinity of a center of three pieces of the support pins 12. Then, the index image projected to the screen plate 14 is taken by the first CCD camera 17. Further, the optical center and the astigmatism axis direction of the lens LE are detected by the control portion 50. The layout screen 64 is displayed with an optical center mark MFO based on the detected optical center. The operator can carry out an alignment by moving the lens LE by constituting a reference by the cup attaching center of the reference axis L1. According to the embodiment, instead of moving the lens LE, the arm 31 of the blocking mechanism portion 30 is moved three-dimensionally by being controlled by the control portion 50 and the cup holder 31a is rotated to thereby automatically change the attaching angle of the cup.

[0040] When the switch 2a is depressed, the control portion 50 moves the arm 31 by controlling respective moving units of the mechanism portion 30 based on the optical center of the lens, the layout data and the like. Further, the control portion 50 rotates the cup 25L mounted to the cup holder 31a. Further, when the alignment position is determined, the control portion 50 moves down the arm 31. Thereby, the cup 25L is fixed to the surface of the lens LE. In this way, the operator attaches the cups 25L, 25R respectively to the pair of left and right lenses LE. Further, the cups 25L, 25R of the embodiment fix the lens LE and the cup 25L (25R) by interposing an adhering double surfaces tape therebetween. However, the invention is not limited thereto but a cup formed with the flange portion 26 by adhering rubber will do.

[0041] Next, an explanation will be given of processing of a lens by the processing apparatus 200. Fig. 8 shows an example of a data input screen displayed on the display 210. The operator inputs the operation number by the numerical keypad displayed by depressing an operation number input column 212. Thereafter, a target lens shape data and a layout data or the like in correspondence with the operation number and the like are called from the memory 51 of the cup attaching apparatus 1 by the control portion 250. Further, the data are stored to the memory 251 on the side of the processing apparatus 200. Respective display columns at a lower portion of the screen are set based on the called layout data and processing condition data and the like. Further, the upper portion of the screen is displayed with a target lens shape FTR for the right eye and a target lens shape FTL for the left eye. Further, the geometrical centers FC of respective target lens shapes and optical centers MFO are diagrammatically displayed. Further, the layout data, and the processing condition data can also be inputted on the side of the processing apparatus 200.

[0042] In Fig.8, the upper portion of the screen is displayed with left and right selecting keys 214R, 214L as means for selecting which of left and right lenses the lens LE to be processed is. When the operator depresses the key 214R for the right eye, by controlling to display the display 210 by the control portion 250, a display area of the key 214R is displayed by red color. Further, a color at inside of the target lens shape diagram FTR for the right eye is displayed (including a case of approximate color). In a state of selecting the right eye, insides of the key 214L for selecting the left eye and the target lens shape diagram FTL for the left eye are fixed by a color the same as that of a background of the screen. On the other hand, when the key 214L for the left eye is depressed, a display area of the key 214L is displayed by green color. Simultaneously therewith, the color at inside of the target lens shape diagram FTL for the left eye is displayed by green color (including also a case of approximate color). Further, in a state of selecting the left eye, insides of the key 214R for selecting the right eye and the target lens shape diagram FTR for the right eye are fixed by a color the same as that of the background of the screen.

[0043] The operator confirms the colors and the colors of the cups 25R, 25L fixed to the lens LE. Thereby, it can visually be confirmed easily which is the lens LE to be held by the lens chuck shafts 102R, 102L. That is, when the right eye is selected, insides of the display area of the selected key 214R and the target lens shape diagram FTR for the right eye are displayed by red color. There-

fore, the lens LE attached with the cup 25R of the corresponding red color may be mounted to the cup holder 130 of the lens chuck shaft 102L. When the left eye is selected, insides of the display area of the selected key 214L and the target lens shape diagram FTL are displayed by green color. Therefore, the lens LE attached with the cup 25L of green color in correspondence with the color may be mounted to the cup holder 130. Thereby, a failure of mistaking left or right of the lenses LE can significantly be reduced. Further, display colors of insides of the display areas of the selected keys 214R, 214L and the target lens shape diagrams FTR, FTL as the information of identifying left and right lenses displayedbased on selecting left and right lenses are displayed in correspondence with coloring the cups 25R, 25L. Therefore, optical recognizability can considerably be improved and the left and right lenses can easily be identified.

[0044] When processing the lens for the right eye, the base portion of the cup 25R attached to the lens LE for the right eye is mounted to the cup holder 130. At this occasion, red color is applied to also a portion of the flange portion 26 exposed from the cup holder 130. Therefore, even after mounting the cup 25R to the cup holder 130, the color can optically be recognized easily. The operator can feel at ease by confirming the corresponding relationship with the display color for identifying left and right lenses of the display 210. When a chuck switch 220a arranged at the operation switch panel 220 is depressed, the lens chuck shaft 102R is moved to the side of the lens to chuck the lens LE by being controlled by the control portion 250.

[0045] Further, as means for displaying the information of identifying left and right lenses by colors respectively in correspondence with colors of the left and right cups, there may be adopted a method of totally or partially changing a color of a lower half of the screen other than changing the display colors of the key 214R and the key 214L. Furthermore, other display may be used separately from the color display 210. For example, LED 230R of red color and LED 230L of green color may be arranged at a vicinity of the chuck switch 220a. Thereby, in correspondence with a signal of selecting left and right lenses, when the right eye is selected, LED 230R of red color is lighted. Further, when the left eye is selected, LED 230L of green color is lighted. When the lens is chucked, the switch 220a is operated, and therefore, when LEDs 230R and 230L are arranged at a vicinity thereof, a color can be confirmed at steps of operation, and therefore, the arrangement is convenient.

[0046] After chucking the lens, when a processing start switch of the operation switch panel 220 is depressed, first, the shape of the lens LE is measured based on the target lens shape data. Successively, the respective motors of the carriage portion 100 are controlled. Further, the peripheral edge of the lens LE held by the lens chuck shafts 102R and 102L is roughened by the roughing grindstone 162a, thereafter; finished by the finishing grindstone 162b. When bevel-facing is set, the bevel is calculated based on the edge path position shape of the lens to carry out bevel-finishing. Further, when the grooving is set, the peripheral edge of the lens LE is plane-finished, thereafter, grooved by the boring/grooving mechanism portion 190. When boring is instructed, the peripheral edge of the lens LE is plane-finished, thereafter, bored by the boring/grooving mechanism portion 190 (refer to, for example, USP6790124 (JP-A-2003-145328)).

[0047] When the lens for the right eye has been finished toprocess, the operator selects processing of the lens for the left eye by the selecting key 214L, holds the lens LE attached with the cup 25L of green color by the lens chuck shafts 102R, 102L to similarly process the peripheral edge of the lens LE. Also in this case, mistaking left and right lenses can be alleviated by confirming the corresponding relationship between the key 214L, the display color at inside of the target lens shape diagram FTL and a color of the cup 25L.

Claims

1. An eyeglass lens processing apparatus for processing a peripheral edge of an eyeglass lens, comprising:

data inputting means for inputting a target lens shape data and a layout data;
a cup for a left eye and a cup for a right eye to which identifying information for identifying the cup for the left eye and the cup for the right eye, which can be visually identified by a processor, is applied; and
displaying means for displaying identifying information the same as the identifying information applied to the cup for the left eye or the right eye based on data inputted to the data inputting means.

2. The eyeglass lens processing apparatus according to claim 1 further comprising a cup attaching apparatus for attaching, to the eyeglass lens, the cup constituting an auxiliary piece for attaching the eyeglass lens to the eyeglass lens processing apparatus,
wherein the cup attaching apparatus includes left and right selecting means for selecting whether the lens attached to the cup is for the left eye or for the right eye, and displaying means for displaying identifying information the same as the identifying information applied to the cup for the left eye or the right eye selected by the left and right selecting means.

3. The eyeglass lens processing apparatus according to claim 1, wherein the identifying information identified visually by the processor is applied at least to a flange portion.

4. The eyeglass lens processing apparatus according to claim 1, wherein the identifying information identified visually by the processor is color information.

FIG. 1

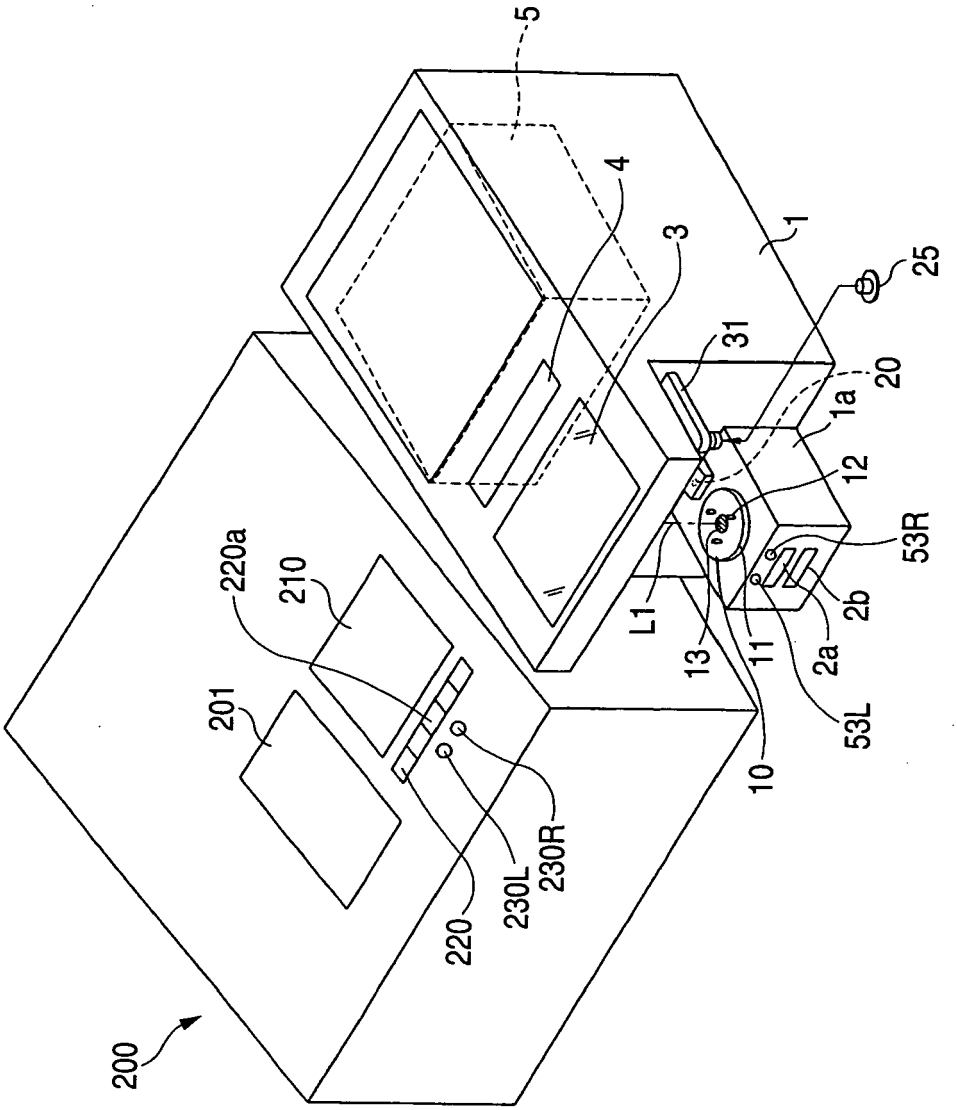

5
4
3
1
25
31
20
1a
12
53R
2b
2a
53L
10
11
13
L1
220a
210
201
200
220
230L
230R

FIG. 2

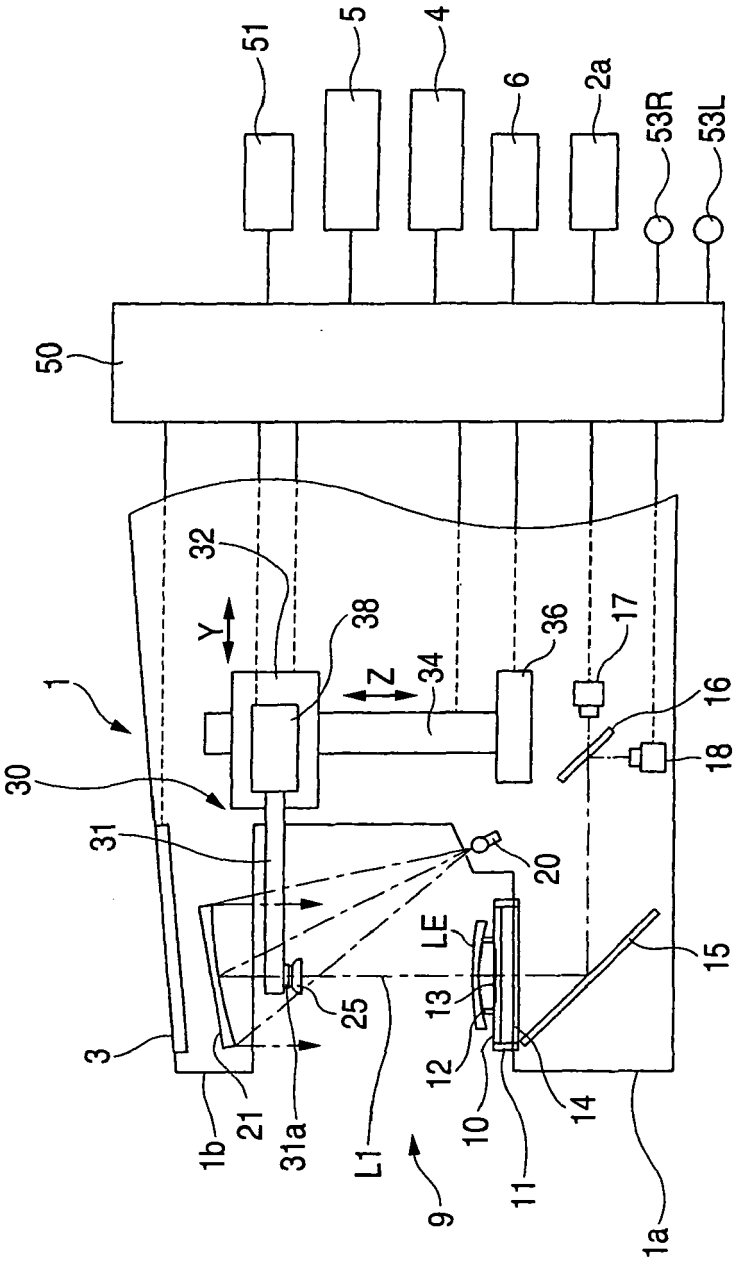

51
5
4
6
2a
53R
53L
50
32
Y
38
36
17
Z
34
1
16
30
18
31
20
LE
15
25
13
3
12
21
31a
L1
10
14
1b
9
11
1a

FIG. 3

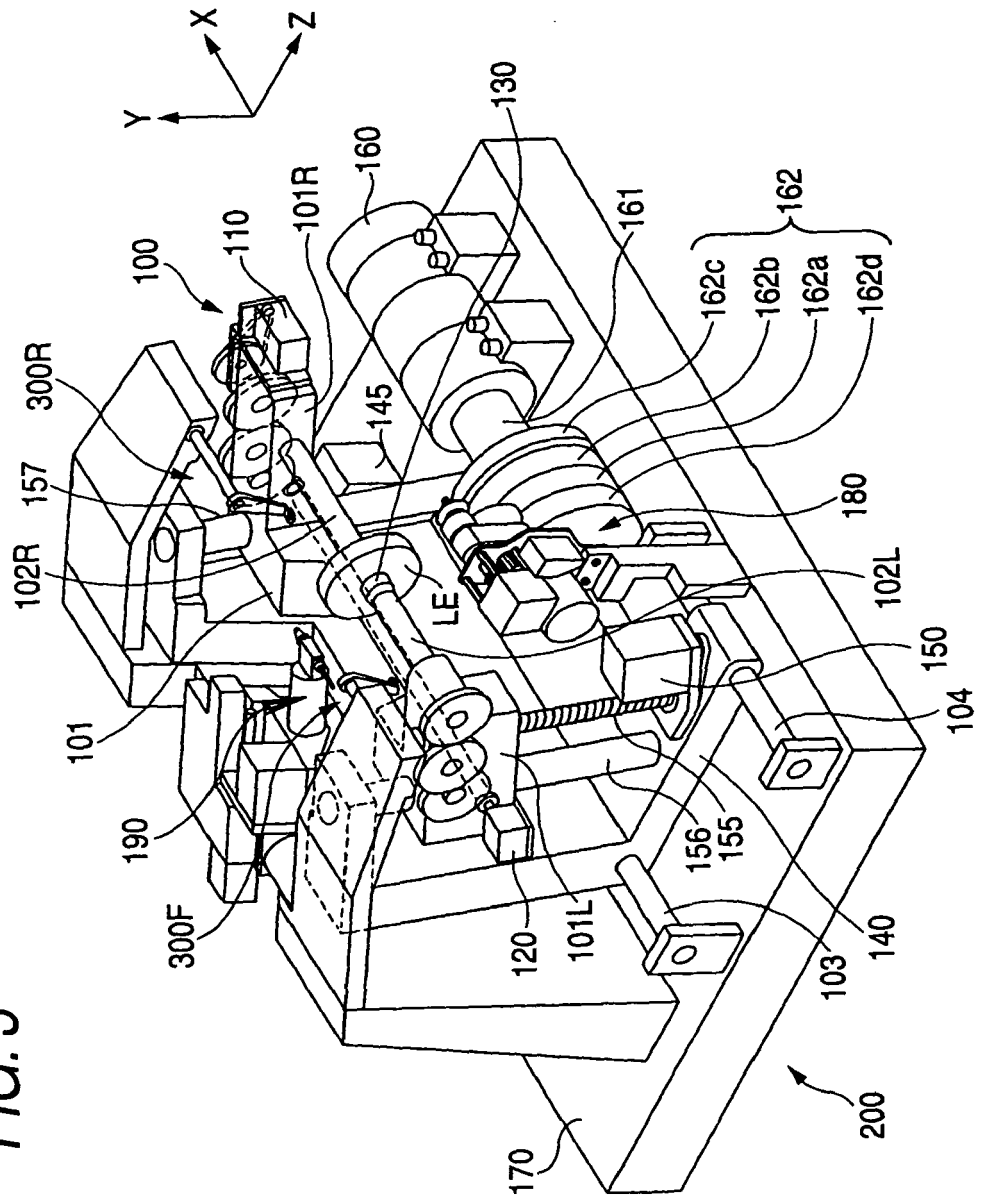

X
Z
Y
130
160
101R
110
100
161
162
162c
162b
162a
162d
300R
145
157
180
102R
LE
102L
150
104
101
190
156
155
300F
120
101L
103
140
200
170

FIG. 4

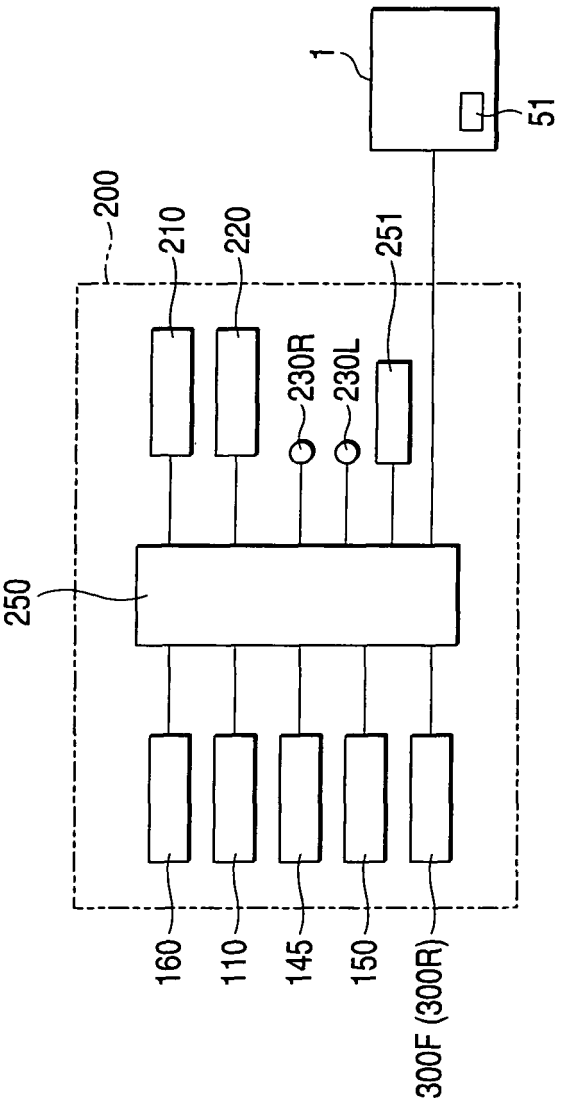


FIG. 5

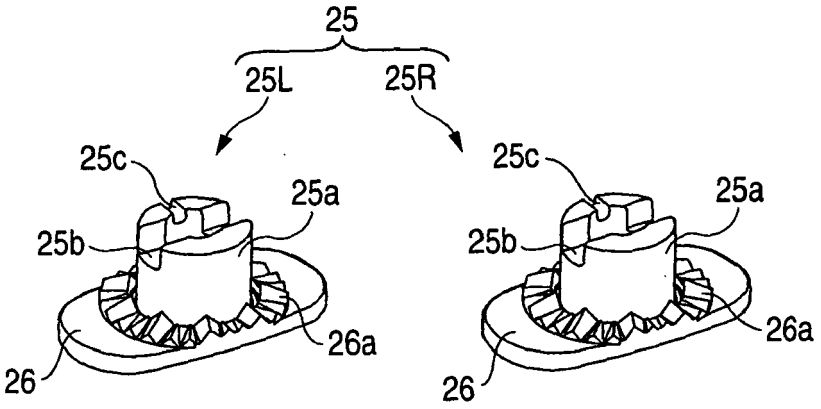

25
25L
25R
25c
25a
25b
26a
26
25c
25a
25b
26a
26

FIG. 6

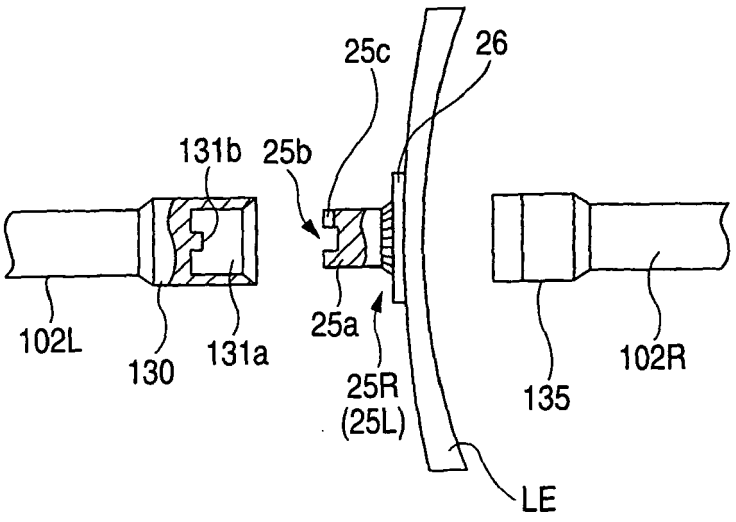

25c
26
131b
25b
102L
130
131a
25a
25R
(25L)
135
102R
LE

FIG. 7

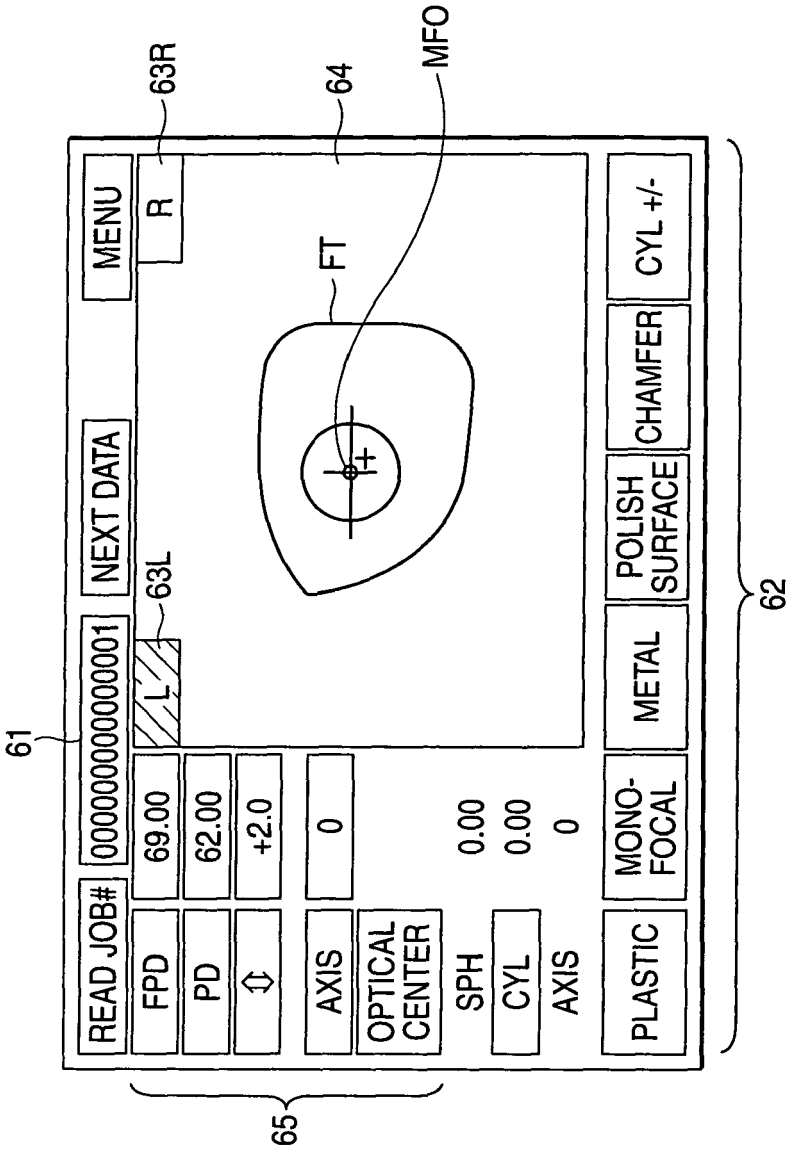
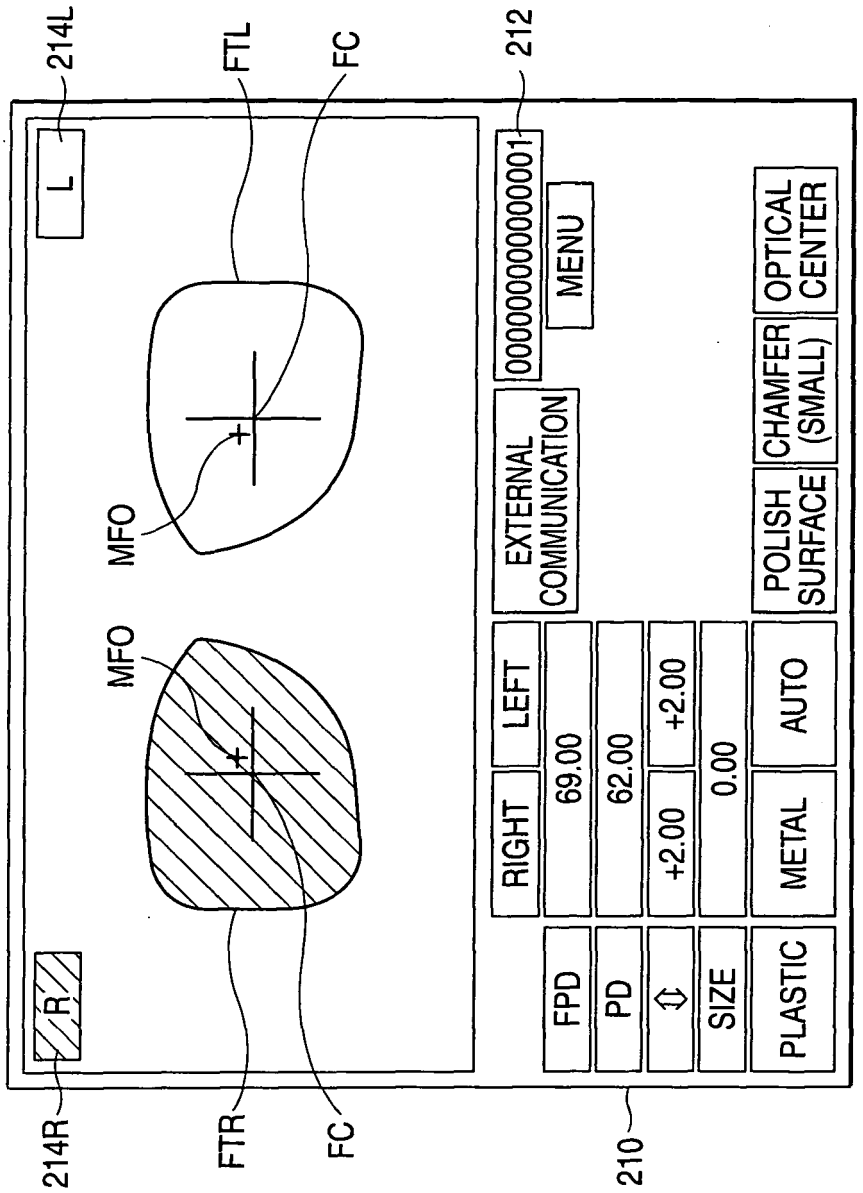

61
63R
64
MFO
63L
FT
READ JOB#
00000000000001
FPD
69.00
PD
62.00
AXIS
0
OPTICAL CENTER
SPH
0.00
CYL
0.00
AXIS
0
MENU
R
NEXT DATA
L
PLASTIC
MONO-FOCAL
METAL
POLISH SURFACE
CHAMFER
CYL +/-
65
62

FIG. 8


214L
FTL
FC
212
L
MFO
MFO
EXTERNAL COMMUNICATION
00000000000001
MENU
OPTICAL CENTER
CHAMFER (SMALL)
POLISH SURFACE
RIGHT
LEFT
69.00
62.00
+2.00
+2.00
0.00
AUTO
METAL
FPD
PD
SIZE
PLASTIC
R
214R
FTR
FC
210

REFERENCES CITED IN THE DESCRIPTION

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