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Sheet	1	of	1		

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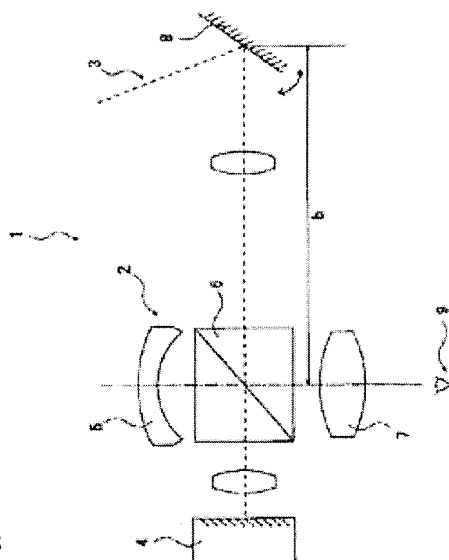
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(54) OPTICAL EQUIPMENT

(57)Abstract:

PROBLEM TO BE SOLVED: To provide optical equipment that can be accurately focused on an intended object.
SOLUTION: A camera is equipped with a photographing optical system, and a range finder optical system 1 consisting of a range finder optical system 3 interlocked with the photographing optical system and a finder optical system 2, and the movable mirror 8 of the optical system 3 is adjusted so that a range finder image is aligned with a finder image within the field of a finder, whereby the focusing of the photographing optical system is performed. The camera is equipped with a line sensor 4 so as to detect a state where the finder image is aligned with the range finder image by using the sensor 4. The mirror 8 is moved by following the extending and withdrawing operation of the lens of the photographing optical system. By interlocking the extending and withdrawing operation of the lens of the photographing optical system with the sensor 4, the mirror 8 is automatically adjusted.



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CLAIMS

[Claim(s)]

[Claim 1]A photographing optical system.

A range finder optical system and a finder optical system which are interlocked with said photographing optical system.

In an optical instrument which performs focus doubling, it has a sensor which detects coincidence condition of a finder image and a range finder image by adjusting said photographing optical system so that it may be the optical instrument provided with the above and a finder image and a range finder image may be abbreviated—in agreement.

[Claim 2]The optical instrument according to claim 1 characterized by an actuator of said photographing optical system driving based on an output signal of said sensor.

[Claim 3]The optical instrument according to claim 1 or 2, wherein said sensor is a line sensor.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the optical instrument which performs focus doubling of a photographing optical system by adjusting a range finder optical system so that a range finder image may be in agreement to a finder image.

[0002]

[Description of the Prior Art]As shown in drawing 4, outline composition of the coupled range finder camera is carried out from the finder lens 21, the semitransparent mirror 22, the eyepiece 23, and the movable reflector 24.

The semitransparent mirror 22 and the movable reflector 24 maintain the fixed distance b, and are provided.

The distance of this semitransparent mirror 22 and movable reflector 24 is called base length b.

[0003]When a user's eyes are put on the position of A and the photographic subject 25 is looked into by this coupled range finder camera, a user, The image (visual field image) of the photographic subject 25 which passed the finder lens 21, and the semitransparent mirror 22 and the eyepiece 23, and the image (range finder image) of the photographic subject 25 which was reflected with the movable reflector 24 and reflected with the semitransparent mirror 22 can be seen. A focus can be doubled with the photographic subject 25 by moving the movable reflector 24, while a user checks the agreement condition of the double image of this visual field image and a range finder image visually, and making a double image agree.

[0004]

[Problem to be solved by the invention]However, since the agreement condition of this double image judged by a user's viewing, the user by a user's eyesight whose eyesight it is [however] large and is weak had a case where it was difficult to double a focus. It is autofocus, and when performing focusing, it is difficult for there to be no telling where range but to double a focus with the intended photographic subject certainly.

[0005]SUBJECT of this invention is providing the optical instrument which can carry out focus doubling to the intended photographic subject correctly.

[0006]

[Means for solving problem]That the above SUBJECT should be solved the invention according to claim 1, [for example, / have a coupled range finder camera optical system (1) which consists of a photographing optical system, a range finder optical system (3) interlocked with said photographing optical system, and a finder optical system (2) as shown in drawing 1, and / in the view of a finder], In the optical instrument which performs focus doubling, it is characterized by having the sensor (for example, line sensor 4) which detects the coincidence condition of a finder image and a range finder image by adjusting said photographing optical system so that a finder image and a range finder image may be in agreement.

[0007]According to the invention according to claim 1, since the coincidence condition of a finder image and a range finder image can be checked not only by a user's viewing but by a sensor by having had the sensor, it cannot be based on a user's eyesight but a finder image and a range finder image can be coincided. Therefore, it is possible to double a focus with a photographic subject certainly. Since a user views a finder image and a range finder image, he can check the photographic subject with which the focus is doubled. therefore, a focus is doubled with the intended photographic subject — things can be carried out.

[0008]The invention according to claim 2 is the optical instrument according to claim 1, and is carrying out the feature of the actuator of said photographing optical system driving based on the output signal of said sensor.

[0009]Since regulation of a photographing optical system is automatically performed based on the data which the sensor detected by interlocking the actuator of a photographing optical system with a sensor according to the invention according to claim 2, A focus suits based on the output signal of a sensor, and it is possible to certainly coincide a finder image and a range finder image. Therefore, a focus can be doubled correctly. Since it can have AF function, without establishing the conventional optical system for AF, etc. specially, the optical instrument provided with AF function can be formed compactly.

[0010]The invention according to claim 3 is the optical instrument according to claim 1 or 2, and said sensor is characterized by being a line sensor (4).

[0011]

[Mode for carrying out the invention]Hereafter, with reference to figures, an embodiment of the invention is described in detail.

[0012]A camera which is an optical instrument of this embodiment is provided with a coupled range finder camera optical system which comprises a photographing optical system, and a range finder optical system interlocked with said photographing optical system and a finder optical system, By adjusting said photographing optical system so that a finder image and a range finder image may be in agreement in a view of a finder, it is a camera of a range finder interlocking type which performs focus doubling of said photographing optical system. Here, since a photographing optical system is well-known technology, a graphic display and detailed explanation are omitted.

[0013]As shown in drawing 1, outline composition of the coupled range finder camera optical system 1 is carried out from the well-known finder optical system 2 and the range finder optical system 3, and the line sensor (sensor) 4. Outline composition of the finder optical system 2 and the range finder optical system 3 is carried out from the finder lens 5, the semitransparent mirror 6, the eyepiece 7, and the movable reflector 8, and the semitransparent mirror 6 and the movable reflector 8 maintain the base length b, and are provided.

[0014]According to this finder optical system 2 and the range finder optical system 3, an image of a photographic subject which is not illustrated, Pass along the finder lens 5, the semitransparent mirror 6, and the eyepiece 7, and it goes into a straight user's eyes 9 as a finder image, and it reflects with the movable reflector 8 and the semitransparent mirror 6, and goes into a user's eyes 9 as a range finder image.

[0015]The line sensor 4 is the same as that of what is used as an AF sensor, and as shown in drawing 1, on both sides of the semitransparent mirror 6, the movable reflector 8 is formed in a reverse side. A finder image reflected with the semitransparent mirror 6 and a range finder image which passed the semitransparent mirror 6 carry out image formation on the line sensor 4, and the line sensor 4 changes into an electrical signal this image information by which image formation was carried out. Therefore, the line sensor 4 and the user can catch the same photographic subject now.

[0016]The movable reflector 8 has become rotatable, follows a delivery and **** operation of a taking lens (graphic display abbreviation) of a photographing optical system, and rotates. There are a manual mode which can perform a delivery and **** operation of a taking lens by a user's hand, and

automatic mode automatically performed by a lens actuator which is interlocked with the line sensor 4 and is not illustrated based on output data of the line sensor 4. If the movable reflector 8 rotates with operation of a taking lens, a range finder image reflected with the movable reflector 8 will come to move with rotation of the movable reflector 8. This is the same also on the line sensor 4, and an output key map of the line sensor 4 comes to be shown in drawing 2. When the movable reflector 8 is rotated, as an arrow shows in drawing 2 (a), the range finder picture signal 10 moves to right and left. For example, if a taking lens is moved so that a range finder image and a finder image may be in agreement in a manual mode, the range finder picture signal 10 approaches the finder image signal 11, and if abbreviated-in agreement, a signal like drawing 2 (b) will be acquired with the line sensor 4.

[0017]It may be made it to be judged for that the agreement with a finder image signal and a range finder picture signal will have agreed if it enters in depth of field even if the finder image signal and the range finder picture signal have shifted as shown in drawing 2 (c). The line sensor 4 is outputted to the control means which does not illustrate the agreement condition of this range finder picture signal 10 and the finder image signal 11.

[0018]The check of the agreement condition of the finder image signal 11 and the range finder picture signal 10 by the line sensor 4 can consider how to perform without distinguishing the method of distinguishing the finder image signal 11 and the range finder picture signal 10, respectively, and performing them, and the finder image signal 11 and the range finder picture signal 10. . In the case of the former, make into the range finder picture signal 10 the signal which follows a motion of a lens. Or by making into the finder image signal 11 the signal acquired by covering a range finder optical system window (graphic display abbreviation) etc., the finder image signal 11 and the range finder picture signal 10 are distinguished, and agreement condition is checked by ranging the distance between 2 images like conventional AF. In the case of the latter, the agreement condition of two signals is checked from the correlation function etc. of the signal which the sensor acquired.

[0019]Next, the focusing method of the above-mentioned camera is explained using drawing 3.

[0020]First, the focusing method in a manual mode is explained. A user turns the taking lens (graphic display abbreviation) of a photographing optical system to a photographic subject, and looks into the eyepiece 7. And the gap condition of the finder image of a photographic subject and a range finder image is checked, and a delivery or **** of a taking lens is performed manually (Step S1). The movable reflector 8 rotates by this, a range finder image moves, and a finder image and a range finder image approach (Step S2). At this time, the range finder image approaches the finder image of the photographic subject on the line sensor 4 (Step S3). The line sensor 4 makes an electrical signal this finder image and a range finder image, and outputs them to the control means which does not illustrate the agreement condition of the signal of two images (step S4).

[0021]As a control means performs focus decision based on the data from the line sensor 4 and shows it to drawing 2 (b), If the finder image signal and the range finder picture signal have agreed, a user will be told about the focus having suited and a focus signal will be outputted, for example to the reporting means (graphic display abbreviation) of a lamp, a buzzer, etc. in this case (Step S5). A focus signal is not outputted when it is judged that the focus does not suit. Therefore, a user performs a delivery or **** operation of a taking lens until a focus is notified by the reporting means.

[0022]When focusing with automatic mode, a delivery and **** of a taking lens are performed by the lens actuator of the photographing optical system which is not illustrated. A control means performs focus decision based on the data from the line sensor 4, and when it is judged that the focus does not suit, in Step S5, a driving signal is outputted to a lens actuator from a control means. A lens actuator performs a delivery or **** of a lens in response to this driving signal. When it focuses, a focus signal is outputted to a reporting means from a control means like a manual mode, and a user is notified of a focus. Also in automatic mode, a delivery or **** of a lens is performed until this focus signal is outputted.

[0023] Thus, since the check of the agreement condition of a finder image and a range finder image is performed [not only according to a user's viewing but] using the line sensor 4 according to the above-mentioned embodiment, it is not influenced by the grade of a user's eyesight but a focus can be doubled correctly. In automatic mode, since the lens driving means is being interlocked with this line sensor 4, focusing operation can be performed correctly automatically. Therefore, since an AF camera and a camera provided with the function of the approximately said appearance can be formed without having a special optical system, the camera which has compact AF function can be formed. Since agreement with the finder image of a photographic subject and a range finder image can be checked also by a user's eyes also in automatic mode, a focus can be doubled with the certainly intended photographic subject.

[0024] In the above example of an embodiment, although the camera was used as an optical instrument, this invention may not be limited to this and may be other optical instruments, such as a video camera. Of course, the structure of each optical system, etc. can be arbitrarily changed suitably also about a concrete constructional detail.

[0025]

[Effect of the Invention] According to the invention according to claim 1, since the coincidence condition of a finder image and a range finder image can be checked by a sensor, it cannot be based on a user's eyesight but a focus can be doubled certainly. Since a finder image and a range finder image can be viewed by a finder, a user can check having doubled the focus with the intended photographic subject.

[0026] According to the invention according to claim 2, since said photographing optical system is automatically adjusted based on the data which the sensor detected, a finder image and a range finder image can certainly be coincided, and a focus can be doubled correctly. Since a special optical system is not needed, the optical instrument which can do focus doubling automatically can be formed compactly.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is a schematic view showing the structure of the coupled range finder camera optical system of the camera as an example which applied this invention.

[Drawing 2]It is an output key map of a line sensor, and (a) is a figure showing the state where the finder image signal and the range finder picture signal have not lapped, (b) is a figure showing the state where the finder image signal and the range finder picture signal have lapped thoroughly, and (c) is a figure showing the state of entering in depth of field, although the finder image signal and the range finder picture signal have not lapped thoroughly.

[Drawing 3]It is a figure showing the flow of the focusing method of the camera shown in drawing 1.

[Drawing 4]It is a schematic view showing the structure of the coupled range finder camera optical system of the conventional camera.

[Explanations of letters or numerals]

- 1 Coupled range finder camera optical system
- 2 Finder optical system
- 3 Range finder optical system
- 4 Line sensor

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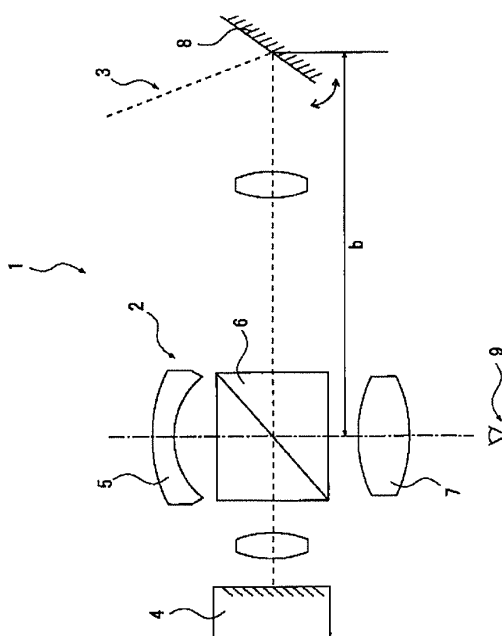
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(54) 【発明の名称】 光学機器

(57) 【要約】

【課題】 意図した被写体に正確にピント合わせを行うことができる光学機器を提供する。

【解決手段】 撮影光学系と、前記撮影光学系と連動する距離計光学系3とファインダー光学系2とからなるレンジファインダー光学系1とを備え、ファインダーの視野内において、ファインダー像に対して距離計像が一致するように前記距離計光学系3の可動鏡8を調節することによって前記撮影光学系のピント合わせを行うカメラにおいて、ラインセンサ4を備え、ファインダー像と距離計像との一致具合をこのラインセンサ4によって検知する。また、可動鏡8を撮影光学系のレンズの繰出・繰込に追従して動くようにし、この撮影光学系のレンズの繰出・繰込をラインセンサ4に連動させることにより、自動的に可動鏡8の調節が行われるようにする。



【特許請求の範囲】

【請求項1】 撮影光学系と、前記撮影光学系と連動する距離計光学系とファインダー光学系とからなるレンジファインダー光学系とを備え、ファインダーの視野内において、ファインダー像と距離計像とが略一致するように前記撮影光学系を調節することによってピント合わせを行う光学機器において、ファインダー像と距離計像との一致具合を検知するセンサを備えていることを特徴とする光学機器。

【請求項2】 前記センサの出力信号に基づいて、前記撮影光学系の駆動部が駆動することを特徴とする請求項1記載の光学機器。

【請求項3】 前記センサは、ラインセンサであることを特徴とする請求項1または2記載の光学機器。

【発明の詳細な説明】**【0001】**

【発明の属する技術分野】 本発明は、ファインダー像に対して距離計像が一致するように距離計光学系を調整することによって、撮影光学系のピント合わせを行う光学機器に関する。

【0002】

【従来の技術】 レンジファインダーは、図4に示すように、ファインダーレンズ21、半透明鏡22、接眼レンズ23及び可動鏡24から概略構成されており、半透明鏡22と可動鏡24は一定の距離bを保って設けられている。この半透明鏡22と可動鏡24との距離を基線長bと言う。

【0003】 Aの位置に使用者の目を置き、このレンジファインダーで被写体25を覗くと、使用者は、ファインダーレンズ21と半透明鏡22、接眼レンズ23を通過した被写体25の像（視野像）と、可動鏡24で反射され、半透明鏡22で反射された被写体25の像（距離計像）とを見ることができる。この視野像と距離計像との二重像の合致具合を、使用者が目視で確認しながら可動鏡24を動かし、二重像を合致させることにより被写体25に焦点を合わせることができる。

【0004】

【発明が解決しようとする課題】 しかし、この二重像の合致具合は使用者の目視によって判定するため、使用者の視力によるところが大きく、視力の弱い使用者は焦点を合わせることが難しい場合があった。また、オートフォーカスで焦点合わせを行う場合は、どこを測距しているかわからず、意図した被写体に確実に焦点を合わせることが難しい。

【0005】 本発明の課題は、意図した被写体に正確にピント合わせを行うことができる光学機器を提供することである。

【0006】

【課題を解決するための手段】 以上の課題を解決すべく請求項1記載の発明は、例えば図1に示すように、撮影

光学系と、前記撮影光学系と連動する距離計光学系

（3）とファインダー光学系（2）とからなるレンジファインダー光学系（1）とを備え、ファインダーの視野内において、ファインダー像と距離計像とが一致するように前記撮影光学系を調節することによってピント合わせを行う光学機器において、ファインダー像と距離計像との一致具合を検知するセンサ（例えば、ラインセンサ4）を備えていることを特徴としている。

【0007】 請求項1記載の発明によれば、センサを備えたことにより、ファインダー像と距離計像との一致具合を使用者の目視だけでなくセンサによっても確認できるため、使用者の視力によらず、ファインダー像と距離計像とを一致させることができる。したがって、被写体に確実にピントを合わせることが可能である。また、使用者はファインダー像と距離計像とを目視するので、ピントを合わせている被写体を確認することができる。よって、意図した被写体にピントを合わせることができる。

【0008】 請求項2記載の発明は、請求項1記載の光学機器であって、前記センサの出力信号に基づいて、前記撮影光学系の駆動部が駆動することを特徴している。

【0009】 請求項2記載の発明によれば、撮影光学系の駆動部をセンサに連動させることにより、センサの検知したデータを基に自動的に撮影光学系の調節が行なわれるので、センサの出力信号に基づいてピントが合うと共にファインダー像と距離計像とを確実に一致させることが可能である。したがって、ピントを正確に合わせることができる。また、従来のAF用光学系等を特別に設けることなくAF機能を備えることができるので、AF機能を備えた光学機器をコンパクトに形成することができる。

【0010】 請求項3記載の発明は、請求項1または2記載の光学機器であって、前記センサは、ラインセンサ（4）であることを特徴としている。

【0011】

【発明の実施の形態】 以下、図を参照して本発明の実施の形態を詳細に説明する。

【0012】 本実施の形態の光学機器であるカメラは、撮影光学系と、前記撮影光学系と連動する距離計光学系とファインダー光学系とから構成されるレンジファインダー光学系とを備えており、ファインダーの視野内においてファインダー像と距離計像とが一致するように前記撮影光学系を調節することによって、前記撮影光学系のピント合わせを行う距離計連動式のカメラとなっている。ここでは、撮影光学系は周知の技術であるため、図示及び詳細な説明は省略する。

【0013】 レンジファインダー光学系1は、図1に示すように、周知のファインダー光学系2及び距離計光学系3と、ラインセンサ（センサ）4から概略構成される。ファインダー光学系2及び距離計光学系3は、ファインダーレンズ5、半透明鏡6、接眼レンズ7及び可動

鏡8から概略構成されており、半透明鏡6と可動鏡8は基線長bを保って設けられている。

【0014】このファインダー光学系2及び距離計光学系3により、図示しない被写体の像は、ファインダーレンズ5、半透明鏡6及び接眼レンズ7を通して、ファインダー像として真っ直ぐ使用者の目9に入ると共に、可動鏡8及び半透明鏡6で反射して距離計像として使用者の目9に入るようになっている。

【0015】ラインセンサ4は、AFセンサとして用いられるものと同様のものであり、図1に示すように、半透明鏡6を挟んで可動鏡8とは逆側に設けられている。半透明鏡6で反射したファインダー像と、半透明鏡6を通過した距離計像が、ラインセンサ4上に結像するようになっており、ラインセンサ4はこの結像された像情報を電気信号に変換するものである。従って、ラインセンサ4と使用者は同一の被写体を捉えることができるようになっている。

【0016】また、可動鏡8は回動可能となっており、撮影光学系の撮影レンズ（図示省略）の繰出・繰込動作に追従して回動するようになっている。撮影レンズの繰出・繰込動作は、使用者の手で行うことができる手動モードと、ラインセンサ4に連動してラインセンサ4の出力データを基に図示しないレンズ駆動部により自動的に行われる自動モードとがある。撮影レンズの動作に伴って可動鏡8が回動すると、可動鏡8で反射する距離計像は可動鏡8の回動と共に動くようになる。これはラインセンサ4上でも同様であり、ラインセンサ4の出力概念図は図2に示すようになる。可動鏡8を回動した場合は図2（a）中に矢印で示すように距離計像信号10が左右に動く。例えば手動モードにおいて距離計像とファインダー像とが一致するように撮影レンズを動かすと、距離計像信号10がファインダー像信号11に近づいていき、略一致するとラインセンサ4では図2（b）のような信号が得られる。

【0017】なお、ファインダー像信号と距離計像信号との合致は、図2（c）に示すように、ファインダー像信号と距離計像信号とがずれていても被写界深度内に入れば合致していると判断されるようにしても良い。ラインセンサ4はこの距離計像信号10とファインダー像信号11との合致具合を図示しない制御手段へ出力する。

【0018】ラインセンサ4によるファインダー像信号11と距離計像信号10との合致具合の確認は、ファインダー像信号11と距離計像信号10とをそれぞれ区別して行う方法と、ファインダー像信号11と距離計像信号10とを区別しないで行う方法とが考えられる。前者の場合は、レンズの動きに追従する信号を距離計像信号10とする、あるいは、距離計光学系窓（図示省略）を覆って得られる信号をファインダー像信号11とすること等によりファインダー像信号11と距離計像信号10とを区別し、2像間の距離を従来のAFと同様に測距す

ることで合致具合を確認する。後者の場合は、センサが得た信号の相関関数等から2つの信号の合致具合を確認する。

【0019】次に、上記カメラの合焦方法を図3を用いて説明する。

【0020】まず、手動モードでの合焦方法を説明する。使用者は被写体に撮影光学系の撮影レンズ（図示省略）を向け、接眼レンズ7を覗く。そして、被写体のファインダー像と距離計像とのズレ具合を確認し、手動にて撮影レンズの繰出または繰込を行う（ステップS1）。これにより可動鏡8が回動して、距離計像が移動し、ファインダー像と距離計像とが近づく（ステップS2）。このとき、ラインセンサ4上においても被写体のファインダー像に距離計像が近づいていく（ステップS3）。ラインセンサ4はこのファインダー像と距離計像を電気信号とし、2像の信号の合致具合を図示しない制御手段に出力する（ステップS4）。

【0021】制御手段は、ラインセンサ4からのデータを基に合焦判断を行い、図2（b）に示すように、ファインダー像信号と距離計像信号とが合致していれば、ピントが合ったことを使用者に知らせ、この場合、例えばランプやブザーなどの通知手段（図示省略）に合焦信号を出力する（ステップS5）。焦点が合っていないと判断した場合は、合焦信号は出力されない。従って、使用者は通知手段により合焦が通知されるまで撮影レンズの繰出または繰込操作を行う。

【0022】自動モードで合焦を行う場合は、撮影レンズの繰出及び繰込は図示しない撮影光学系のレンズ駆動部によって行われる。制御手段がラインセンサ4からのデータを基に合焦判断を行い、焦点が合っていないと判断した場合には、ステップS5において制御手段からレンズ駆動部へと駆動信号が出力される。レンズ駆動部は、この駆動信号を受けてレンズの繰出または繰込を行う。合焦した場合は、手動モードと同様に制御手段から通知手段へ合焦信号が出力され、使用者に合焦が通知される。自動モードの場合も、この合焦信号が出力されるまでレンズの繰出または繰込が行われる。

【0023】このように、上記実施の形態によれば、ファインダー像と距離計像との合致具合の確認を使用者の目視によるだけでなく、ラインセンサ4を用いて行うので、使用者の視力の程度に左右されず、正確に焦点を合わせることができる。また、自動モードでは、レンズ駆動手段がこのラインセンサ4と連動しているので、合焦操作を自動的に正確に行うことができる。従って、AFカメラと略同様の機能を備えるカメラを特別な光学系を備えずに形成することができるので、コンパクトなAF機能を有するカメラを形成することができる。また、自動モードにおいても使用者の目でも被写体のファインダー像と距離計像との合致を確認することができるので、確実に意図した被写体にピントを合わせることができ

る。

【0024】なお、以上の実施の形態例においては、光学機器としてカメラを用いたが、本発明はこれに限定されるものではなく、ビデオカメラなどの他の光学機器であっても良い。また、各光学系の構造等も任意であり、その他、具体的な細部構造等についても適宜に変更可能であることは勿論である。

【0025】

【発明の効果】請求項1記載の発明によれば、センサによってファインダー像と距離計像との一致具合を確認できるため、使用者の視力によらず、確実にピントを合わせることができる。また、ファインダーにてファインダー像と距離計像とを目視することができるので、意図した被写体にピントを合わせていることを使用者が確認することができる。

【0026】請求項2記載の発明によれば、センサの検出したデータを基に前記撮影光学系の調節を自動的に行うので、ファインダー像と距離計像とを確実に一致させることができ、ピントを正確に合わせることができる。また、特別な光学系を必要としないので、自動的にピント合わせができる光学機器をコンパクトに形成すること

ができる。

【図面の簡単な説明】

【図1】本発明を適用した一例としてのカメラのレンジファインダー光学系の構造を示す概略図である。

【図2】ラインセンサの出力概念図であり、(a)はファインダー像信号と距離計像信号とが重なっていない状態を示す図であり、(b)はファインダー像信号と距離計像信号とが完全に重なっている状態を示す図であり、

(c)はファインダー像信号と距離計像信号とが完全に重なっていないが、被写界深度内に入っている状態を示す図である。

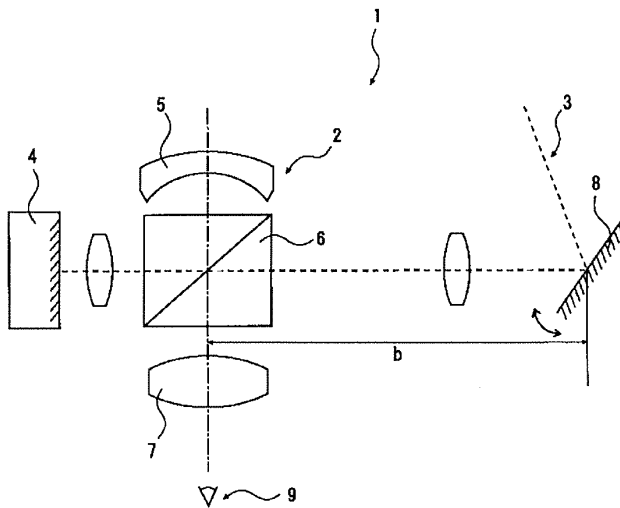
【図3】図1に示すカメラの合焦方法の流れを示す図である。

【図4】従来のカメラのレンジファインダー光学系の構造を示す概略図である。

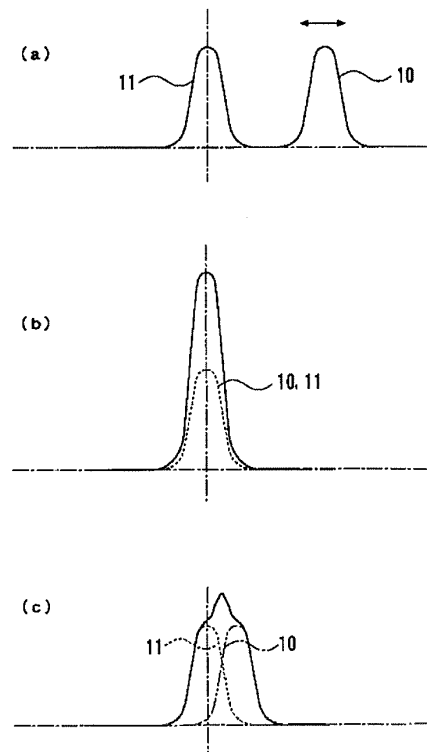
【符号の説明】

- 1 レンジファインダー光学系
- 2 ファインダー光学系
- 3 距離計光学系
- 4 ラインセンサ

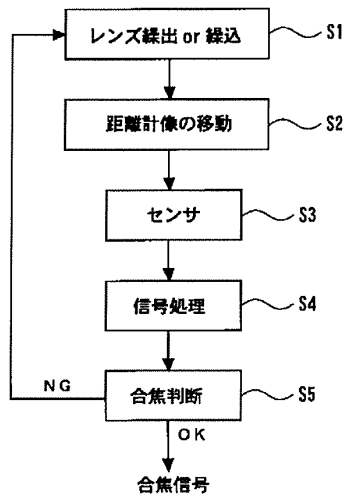
【図1】



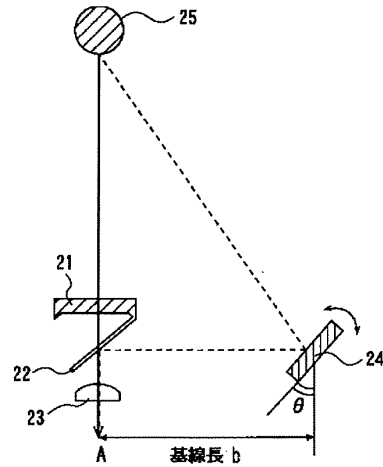
【図2】



【図3】



【図4】



フロントページの続き

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 2H018 BC01 BC02
 2H051 BB04 BB05 CA05 CB02 CB11
 CB20 CB28

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SE-US105228
		Application Number	
Title of Invention	DIGITAL CAMERA AND METHOD FOR MANUFACTURING SAME		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

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☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	☐ Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Ryuichi		SHIOHARA		
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service					
City	Matsumoto, Nagano	Country Of Residenceⁱ	JP		
Citizenship under 37 CFR 1.41(b)ⁱ		JP			
Mailing Address of Applicant:					
Address 1	c/o SEIKO EPSON CORPORATION				
Address 2	3-5 Owa, 3-chome				
City	Suwa, Nagano	State/Province			
Postal Code	392-8502	Countryⁱ	JP		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					Add

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Application Information:

Title of the Invention	DIGITAL CAMERA AND METHOD FOR MANUFACTURING SAME		
Attorney Docket Number	SE-US105228	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	11	Suggested Figure for Publication (if any)	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SE-US105228
		Application Number	
Title of Invention	DIGITAL CAMERA AND METHOD FOR MANUFACTURING SAME		

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Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
Additional Domestic Priority Data may be generated within this form by selecting the Add button.			Add

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			Remove
Application Number	Country ⁱ	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
2009-295202	JP	2009-12-25	☒ Yes ☐ No
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number		SE-US105228	
		Application Number			
Title of Invention		DIGITAL CAMERA AND METHOD FOR MANUFACTURING SAME			
Organization Name		SEIKO EPSON CORPORATION			
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Address 2		Shinjuku-ku			
City		Tokyo		State/Province	
Country i	JP	Postal Code		163-0811	
Phone Number				Fax Number	
Email Address					
Additional Assignee Data may be generated within this form by selecting the Add button. Add					

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Signature	/Akiyoshi Onda/			Date (YYYY-MM-DD)	2010-12-22
First Name	Akiyoshi	Last Name	Onda	Registration Number	63773

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Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		DIGITAL CAMERA AND METHOD FOR MANUFACTURING SAME		
First Named Inventor/Applicant Name:		Ryuichi SHIOHARA		
Filer:		David L. Tarnoff/Megumi McKeever		
Attorney Docket Number:		SE-US105228		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility application filing	1011	1	330	330
Utility Search Fee	1111	1	540	540
Utility Examination Fee	1311	1	220	220
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1090

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EFS ID:	9098263
Application Number:	12976048
International Application Number:	
Confirmation Number:	6698
Title of Invention:	DIGITAL CAMERA AND METHOD FOR MANUFACTURING SAME
First Named Inventor/Applicant Name:	Ryuichi SHIOHARA
Customer Number:	22919
Filer:	David L. Tarnoff/Megumi McKeever
Filer Authorized By:	David L. Tarnoff
Attorney Docket Number:	SE-US105228
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Time Stamp:	15:01:46
Application Type:	Utility under 35 USC 111(a)

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Payment Type	Deposit Account
Payment was successfully received in RAM	\$1090
RAM confirmation Number	1624
Deposit Account	501836
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File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		SE-US105228_Application.PDF	691793	yes	40
			cb7279d5cc8badce45e06c62bc7177b270d01b99		
	Multipart Description/PDF files in .zip description				
	Document Description		Start		End
	Transmittal of New Application		1		2
	Specification		3		21
	Claims		22		23
	Abstract		24		24
	Drawings-only black and white line drawings		25		35
	Oath or Declaration filed		36		38
	Transmittal Letter		39		39
	Information Disclosure Statement (IDS) Filed (SB/08)		40		40
Warnings:					
Information:					
2	Foreign Reference	JP-2002-122907.PDF	296125	no	12
			985a935909a6782c54675d5bf3673c78464e8aa9		
Warnings:					
Information:					
3	Application Data Sheet	SE-US105228_ADS.pdf	1196934	no	4
			7fdd8bdea2637589cada031d0880e71a9d1408d9		
Warnings:					
Information:					
4	Fee Worksheet (PTO-875)	fee-info.pdf	32806	no	2
			11273a94c5003f16f35b7ca19deff12b3783650a		
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UTILITY PATENT APPLICATION TRANSMITTAL (Only for new nonprovisional applications under 37 CFR 1.53(b))	Attorney Docket No.	SE-US105228
	First Inventor	Ryuichi SHIOHARA
	Title	DIGITAL CAMERA AND METHOD FOR MANUF
	Express Mail Label No.	

APPLICATION ELEMENTS See MPEP chapter 600 concerning utility patent application contents.	ADDRESS TO: Commissioner for Patents P.O. Box 1450 Alexandria VA 22313-1450
1. ☒ Fee Transmittal Form (e.g., PTO/SB/17) 2. ☐ Applicant claims small entity status. See 37 CFR 1.27. 3. ☒ Specification [Total Pages <u>22</u>] Both the claims and abstract must start on a new page (For information on the preferred arrangement, see MPEP 608.01(a)) 4. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets <u>11</u>] 5. Oath or Declaration [Total Sheets <u>3</u>] a. ☒ Newly executed (original or copy) b. ☐ A copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional with Box 18 completed) i. ☐ DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b). 6. ☒ Application Data Sheet. See 37 CFR 1.76 7. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix) ☐ Landscape Table on CD 8. Nucleotide and/or Amino Acid Sequence Submission (if applicable, items a. – c. are required) a. ☐ Computer Readable Form (CRF) b. ☐ Specification Sequence Listing on: i. ☐ CD-ROM or CD-R (2 copies); or ii. ☐ Paper c. ☐ Statements verifying identity of above copies	ACCOMPANYING APPLICATION PARTS 9. ☐ Assignment Papers (cover sheet & document(s)) Name of Assignee _____ 10. ☐ 37 CFR 3.73(b) Statement (when there is an assignee) ☒ Power of Attorney 11. ☐ English Translation Document (if applicable) 12. ☒ Information Disclosure Statement (PTO/SB/08 or PTO-1449) ☒ Copies of citations attached 13. ☐ Preliminary Amendment 14. ☐ Return Receipt Postcard (MPEP 503) (Should be specifically itemized) 15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed) 16. ☐ Nonpublication Request under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent. 17. ☐ Other: _____
18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76: ☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____ Prior application information: _____ Examiner: _____ Art Unit: _____	

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Signature	/Akiyoshi Onda/			Date	December 22, 2010
Name (Print/Type)	Akiyoshi Onda			Registration No. (Attorney/Agent)	63,773

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Effective on 12/08/2004. Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818). FEE TRANSMITTAL For FY 2009		Complete if Known			
☐ Applicant claims small entity status. See 37 CFR 1.27		Application Number			
		Filing Date			
		First Named Inventor			
		Examiner Name			
		Art Unit			
TOTAL AMOUNT OF PAYMENT		(\$)	1,090.00		
		Attorney Docket No.		SE-US105228.	

METHOD OF PAYMENT (check all that apply)

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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	330	165	540	270	220	110	1,090.00
Design	220	110	100	50	140	70	
Plant	220	110	330	165	170	85	
Reissue	330	165	540	270	650	325	
Provisional	220	110	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee (\$)	Small Entity Fee (\$)
Each claim over 20 (including Reissues)	52	26
Each independent claim over 3 (including Reissues)	220	110
Multiple dependent claims	390	195

Total Claims **Extra Claims** **Fee (\$)** **Fee Paid (\$)** **Multiple Dependent Claims**
6 - 20 or HP = 0 x 52 = _____ **Fee (\$)** **Fee Paid (\$)**
 HP = highest number of total claims paid for, if greater than 20. 390 _____

Indep. Claims **Extra Claims** **Fee (\$)** **Fee Paid (\$)**
1 - 3 or HP = 0 x 220 = _____ 390 _____
 HP = highest number of independent claims paid for, if greater than 3.

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$270 (\$135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
<u>33</u>	<u>0</u>	<u>0</u> / 50 = _____ (round up to a whole number)	<u>270</u>	

4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount) _____ **Fees Paid (\$)**

Other (e.g., late filing surcharge): _____

SUBMITTED BY			
Signature	/Akiyoshi Onda/	Registration No. (Attorney/Agent)	63,773 Telephone 202-293-0444
Name (Print/Type)	Akiyoshi Onda		Date December 22, 2010

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DIGITAL CAMERA AND METHOD FOR MANUFACTURING SAME

CROSS-REFERNECE TO THE RELATED APPLICATIONS

[0001] This application claims priority to Japanese Patent Application No. 2009-295202 filed on December 25, 2009. The entire disclosure of Japanese Patent Application No. 2009-295202 is hereby incorporated herein by reference.

BACKGROUND

Technological Field

[0002] The present invention relates to a digital camera and a method for manufacturing the digital camera, and particularly relates to a digital camera capable of manual focusing and of varying the focal length of a main lens, and to a method for manufacturing the digital camera.

Background Technology

[0003] In examples of this type of cameras presented in the past, a so-called double-image matching range finder is provided, the double-image matching range finder which includes a viewfinder optical system including a half mirror, and a range finder optical system for rotating in coupling with the manual focusing operation of an imaging lens using the principle of triangulation. Japanese Laid-open Patent Application Publication No. 2002-122907 discloses such camera, as an example. In such a camera, the image used as the viewfinder image is an image in which a range finder image inputted from the range finder optical system is superimposed, via the half mirror, on a viewfinder image inputted from the viewfinder optical system.

SUMMARY

[0004] In the camera described above, the range finder optical system must be precisely rotated in coupling with the manual focusing operation, and a complex mechanism is therefore required. In such a mechanism, high precision is required in the manufacturing tolerances and assembly in the camera for each of the components of the mechanism, and time-consuming adjustment must be performed during assembly.

[0005] A main object of the present invention is to provide a digital camera for generating a composite image in which two images are superimposed by a simple mechanism, and to provide a method for manufacturing the camera.

[0006] In order to achieve the above objects, the digital camera according to the present invention is provided.

[0007] The digital camera has a focusing function and a focal length varying function of a main lens. The digital camera includes a main imaging unit configured to generate a main image by performing a photoelectric conversion from a subject obtained via the main lens, a sub-imaging unit configured to generate a sub-image by performing a photoelectric conversion from the subject obtained via a sub-lens, a focal length acquiring unit configured to acquire the focal length of the main lens, a magnification setting unit configured to set a level of magnification on the basis of the focal length, a composite image generating unit configured to generate a composite image by combining the main image and the sub-image, after at least one of the main image and the sub-image is magnified at the level of magnification, and an image display unit configured to display the composite image.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is a view showing the overall configuration of the digital camera;

[0009] FIG. 2 is a perspective view showing the digital camera;

[0010] FIG. 3 is a back view showing the digital camera;

[0011] FIG. 4 is a view showing the concept of the method for generating the cutout rule;

[0012] FIG. 5 is a view showing an example of the cutout position in the sub-image;

[0013] FIG. 6 is a view showing the concept of the method for generating the magnification rule R_b ;

[0014] FIG. 7 is a flowchart showing an example of the viewfinder image display processing routine;

[0015] FIG. 8 is a view showing the generated viewfinder image;

[0016] FIG. 9 is a view showing the relationship between the misalignment of the finder image and the focus;

[0017] FIG. 10 is a flowchart showing an example of the correction processing routine;

[0018] FIG. 11 is a view showing an example of the finder image in the adjustment mode; and

[0019] FIG. 12 is a view showing an example of the steps for manufacturing the digital camera.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0020] Embodiments of the present invention will next be described based on the accompanying drawings. FIG. 1 is a view showing the overall configuration of a digital camera 10 as an embodiment of the present invention, FIG. 2 is a perspective view showing the digital camera 10, and FIG. 3 is a back view showing the digital camera 10.

[0021] The digital camera 10 of the present embodiment is provided with a main body 12, a main electronic imaging unit 20 for performing a photoelectric conversion to an image of a subject and outputting a digital signal, a sub-electronic imaging unit 40 for performing a photoelectric conversion to the subject and outputting a digital signal for generating a viewfinder image, an image processor 70 for receiving as inputs the signals outputted from the main electronic imaging unit 20 and the sub-electronic imaging unit 40, performing predetermined image processing, and generating image data or an image file, a display controller 80 for displaying the image data inputted from the image processor 70 in an EVF (Electronic View Finder) 82 or a liquid crystal monitor 84, a group 90 of various types of operating switches operated by a user, a memory card 60 capable of storing an image file generated by the image processor 70, and a main controller 30 for controlling the device as a whole.

[0022] The main electronic imaging unit 20 is provided with an imaging lens 21 configured as a manual-focus lens interchangeably attached to the main body 12 via a lens mount not shown in the drawing, an image sensor 22 configured as a publicly known CCD image sensor for converting light inputted via the imaging lens mechanism 21 into an electrical signal by photoelectric conversion, a focal-plane shutter 23 disposed between the imaging lens 21 and the image sensor 22, a driver circuit 24 for driving the image sensor 22, and an analog front end (AFE) 26 for converting the electrical signal outputted from the image sensor 22 into a digital signal and outputting the digital signal. The image sensor 22 is configured as a sensor having millions to billions of pixels. A CCD image sensor is described as an example of the image sensor 22, but a CMOS-type image sensor may also be used.

[0023] The imaging lens 21 is provided with a lens group 21a including a combination of a convex lens and a concave lens, an aperture mechanism 21b for adjusting the quantity of light, a distance ring 21c rotated (for focusing) by the user to change the focal point position, and an extending part 21d formed in a helical shape so that the amount of extension thereof changes according to the operation amount (amount of rotation) of the distance ring 21c, the extending part 21d being provided on the attachment side of the imaging lens 21. The optical axis of the imaging lens 21 is parallel to the bottom surface of the main body 12. Although not shown in the drawing, a distance scale is displayed on the external peripheral portion of the distance ring 21c. The extending part 21d is in contact with a coupled roller 29 provided so as to be capable of displacement in the forward and backward directions inside the main body 12. The operation amount of the distance ring 21c is therefore converted to the displacement amount of the coupled roller 29 via the amount of extension of the extending part 21d. A roller position sensor 29a capable of detecting the displacement amount of the coupled roller 29 is installed in the digital camera 10. The operation amount of the distance ring 21c is thereby detected as the detection value of the roller position sensor 29a. Specifically, a value that reflects the focus position of the main electronic imaging unit 20 (imaging lens 21) is detected, and this detection value is used thereafter as the operation amount So.

[0024] The sub-electronic imaging unit 40 is provided with a pan-focus sub-lens 41 having a fixed focal length and having lens groups 41a, 41c and an aperture mechanism 41b, an image sensor 42 including a publicly known CCD image sensor for converting the light inputted via the sub-lens 41 into an electrical signal by photoelectric conversion, a driver circuit 44 for driving the image sensor 42, and an AFE 46 for converting the electrical signal outputted from the image sensor 42 into a digital signal and outputting the digital signal. The optical axis of the sub-electronic imaging unit 40 is parallel to the bottom surface of the main body 12. The sub-electronic imaging unit 40 and the main electronic imaging unit 20 are installed in positions separated by a predetermined interval A in the left-right (horizontal) direction of the main body 12, and by a predetermined interval B in the up-down (vertical) direction. The image sensor 22 of the main electronic imaging unit 20 is configured as a sensor having millions to billions of pixels, whereas the image sensor 42 is configured as a sensor having a number of pixels on the order of hundreds of thousands to millions.

[0025] Although not shown in the drawing, the image processor 70 is provided with various types of image processing function blocks for executing publicly known image processing for a digital camera, such as color interpolation processing for RGB pixels, white balance processing, color reproduction processing, resizing, gamma correction, and image file generation processing. The image processor 70 performs such functions as applying image processing to the input of a digital signal outputted from the main electronic imaging unit 20 and generating a main image GM, converting the generated main image GM to a predetermined format and adding imaging information to generate an image file, and applying image processing to the input of a digital signal outputted from the sub-electronic imaging unit 40 and generating a sub-image GS. The image processor 70 is provided with a cutout processing unit for executing cutout processing for cutting out a partial image from an image, a size adjustment unit for adjusting the size of the image including the cut-out partial image, and a synthesis processing unit for executing synthesis processing for superimposing one image on another image, and a viewfinder image GF for display in the EVF 82 is generated by performing synthesis processing for superimposing the partial image GSp cut out from the sub-image GS on the main image GM. The synthesis processing unit of the image processor 70 is capable of so-called α blending whereby a coefficient α indicating the transparency of the image to be superimposed on top of the bottom image is used to mix the pixel values of the bottom image with the pixel values of the top image to generate pixel values of a composite image.

[0026] The display controller 80 performs such functions as displaying the viewfinder image GF generated by the image processor 70 in the EVF 82, and displaying the main image GM generated by the image processor 70, and an image in the image file stored in the memory card 60 in the liquid crystal monitor 84. The display controller 80 is also capable of enlargement processing for enlarging a specific portion of the viewfinder image GF for display in the EVF 82.

[0027] The operating switch group 90 includes a shutter button 90a and dial switch (SW) 90b, a winding lever 90c, a mode selection button 90d, an OK button 90e, a cancel button 90f, a JOG dial 90g, a focal point selection lever 90h, and other components. The shutter button 90a is a button for receiving an instruction from a user to import an image formed on the image sensor 22 through the imaging lens 21. The dial switch 90b is a switch whereby the user sets various types of settings relating to imaging, such as the shutter speed or an exposure value. The winding lever

90c is a button for returning a shutter curtain (not shown) of the focal-plane shutter 23 from a state in which the shutter is disconnected to a state in which the next shutter operation is possible, and mechanically fixing the shutter in the ready state, by a winding operation. The mode selection button 90d is a button for selecting various modes. Selectable modes include a setting mode in which the brightness of the liquid crystal monitor 84 and various other settings are available, a correction mode for correcting the magnification rule Rb which is used to generate the viewfinder image GF, and other modes. The magnification rule will be described hereinafter. The OK button 90e is a button for determining various types of selections, and the cancel button 90f is a button for canceling a selection which has been made. The JOG dial 90g, when rotated, moves a cursor for selecting various items displayed on the liquid crystal monitor 84, and changes the numerical values of various types of settings. The JOG dial 90g can either be drawn upward or pressed downward, and functions as a dial for scrolling the image displayed on the liquid crystal monitor 84 up and down when the dial is rotated in the upward-drawn state, and as a dial for scrolling the image left and right when the dial is rotated in the downward-pressed state, for example. The focal point selection lever 90h is a lever for selecting the focal length f of the attached imaging lens 21. As shown in FIG. 2, the focal point selection lever 90h enables selection of any of three focal lengths f_1 , f_2 , f_3 , and is placed in the position of the corresponding focal length f by the user when the imaging lens 21 is replaced.

[0028] The main controller 30 is configured as a microprocessor centered around a CPU 32, and is provided with a ROM 34 for storing a processing program and various types of tables, a RAM 36 for temporarily storing data, a flash memory 38 for retaining data in rewritable fashion even when the power supply is turned off, and an input/output port and communication port not shown in the drawing. A cutout rule Rk or magnification rule Rb used to generate the viewfinder image GF is registered in the flash memory 38. Various operating signals from the operating switch group 90, the operation amount S_o from the coupled roller 29, image files read from the memory card 60, various images from the image processor 70, and other information is inputted to the main controller 30. From the main controller 30 are outputted a shutter drive signal to the focal-plane shutter 23, control signals to the driver circuits 24, 44, image files to be written to the memory card 60, image processing commands to the image processor 70, display control commands to the display controller 80, and other information.

[0029] The cutout rule Rk and the magnification rule Rb will next be described. The cutout rule Rk will first be described. The cutout rule Rk is a rule for setting the cutout position K at which a partial image is cut out from the sub-image GS in accordance with a focusing operation in order to generate the viewfinder image GF. FIG. 4 is a view showing the concept of the method for generating the cutout rule Rk, and FIG. 5 is a view showing an example of the cutout position K in the sub-image GS. FIG. 4 shows the positional relationship between the main electronic imaging unit 20 and the sub-electronic imaging unit 40 as viewed from above, and the interval between the imaging units is the predetermined interval A described above. The region indicated by dotted lines in FIG. 4 represents the image in the imaging region of the sub-electronic imaging unit 40. As shown in FIG. 4, a subject (indicated by a black circle in FIG. 4, the same hereinafter) in a position at a distance L1 on the optical axis of the main electronic imaging unit 20 is photographed at a position (indicated by a white circle) of an imaging region at an angle θ_1 from the optical axis of the sub-electronic imaging unit 40. In the same manner, a subject (indicated by a black triangle) at a distance L2 is photographed at a position (indicated by a white triangle) at an angle θ_2 , and a subject (indicated by a black square) at a distance L3 is photographed at a position (indicated by a white square) at an angle θ_3 . The angles θ , distances L, and the predetermined interval A are related by Equation (1) according to a triangulation principle, and since the predetermined interval A is a known constant, the angles θ can be calculated when the distances L are determined. The positional relationship between the imaging units as viewed from the side is not shown, but because the interval between the imaging units in the up-down direction is the predetermined interval B described above, the positional relationship between the imaging units in the up-down direction is expressed by Equation (2) in the same manner as Equation (1) when the angle ϕ is used instead of the angle θ . As shown in FIG. 5, when an XY coordinate system having the center of the sub-image GS (imaging region) as the origin is set with the X axis in the left-right direction and the Y axis in the up-down direction of FIG. 5, the position of the subject image in the sub-image GS moves farther from the origin the closer the distance is from the digital camera 10 to the subject, and closer to the origin the farther the digital camera 10 is from the subject, and the position of the subject image coincides with the origin when the subject is at infinite distance. In order to match the left-right direction of the imaging region shown in FIG. 4, FIG. 5 shows the sub-image GS with left and

right reversed from the original image, for the sake of convenience. The subject image positioned at distance L1 appearing at the center of the main image GM is therefore shown in the sub-image GS centered at position K1 (X1, Y1), which corresponds to distance L1. The operation amount of the distance ring 21c, which changes according to the distance to the subject, is detected as the operation amount So by the roller position sensor 29a, and the distance L can therefore be derived based on the operation amount So. Therefore, the distance L can be derived from the operation amount So, and the angles θ and ϕ can be calculated from the derived distance L and Equations (1) and (2). By setting the relationship between the angle θ and the X coordinate, and the relationship between the angle ϕ and the Y coordinate in advance, the X coordinate value that corresponds to the angle θ , and the Y coordinate value that corresponds to the angle ϕ , i.e., the cutout position K, can be derived. In the present embodiment, the relationship between the operation amount So and the cutout position K is stored as the cutout rule Rk. This cutout rule Rk is stored as a relational expression with respect to the operation amount So and the cutout position K, and in the case of calculating the cutout position K, this relational expression is used to calculate the cutout position K from the operation amount So. The maximum values of the angles θ , ϕ are determined by the angle of view of the sub-lens 41, and the relationship between the angle θ and the X coordinate, and the relationship between the angle ϕ and the Y coordinate can be set from the corresponding X, Y coordinate values.

$$\tan \theta = A/L \quad (1)$$

$$\tan \phi = B/L \quad (2)$$

[0030] The magnification rule Rb will next be described. The magnification rule Rb is a rule for setting the magnification with respect to the sub-image GS so that the subject appears as the same size in the sub-image GS and the main image GM. FIG. 6 is a view showing the concept of the method for generating the magnification rule Rb. FIGS. 6(a) through 6(c) show the main image GM, and FIG. 6(d) shows the sub-image GS. The left and right of the sub-image GS are reversed in FIG. 6(d) as well, the same as in FIG. 5. As described above, since an image sensor 22 and an image sensor 42 having different numbers of pixels are used in the main electronic imaging unit 20 and the sub-electronic imaging unit 40, respectively, the main image GM and the sub-image GS are of different sizes, as shown in the drawings. Lenses 21 having different focal lengths f can be used interchangeably in the main electronic imaging unit 20, and since the angle

of view changes when the focal length f changes, the size of the subject appearing in the main image GM also changes according to the focal length f_1 , f_2 , f_3 , as shown in FIGS. 6(a) through 6(c). A magnification rule Rb in which adjustment magnifications B for aligning the size of the subject image in the sub-image GS with the size of the subject image in the main image GM are set as magnifications B1, B2, B3 and correlated with the focal lengths f_1 , f_2 , f_3 is generated based on the difference in size between the main image GM and the sub-image GS, and the relationship between the focal lengths f_1 , f_2 , f_3 of the imaging lens 21 and the focal length of the sub-lens 41.

[0031] The operation of the digital camera 10 of the present embodiment thus configured will next be described. FIG. 7 is a flowchart showing an example of the viewfinder image display processing routine executed by the main controller 30. This routine is executed from the time a power supply button (not shown) is switched on and an imaging mode is started until the power supply button is switched off. Image processing, display control, and other processing is actually performed mainly by the image processor 70 and the display controller 80, but no particular distinction is made between main areas of processing in the following description. When the viewfinder image display processing routine is executed, the main controller 30 first drives the image sensor 22 of the main electronic imaging unit 20 and reads the digital signal thereof (step S100), and drives the image sensor 42 of the sub-electronic imaging unit 40 and reads the digital signal thereof (step S110). Various types of image processing are then applied to the read digital signals to generate the main image GM and the sub-image GS (step S120). When the main image GM and sub-image GS are generated, the focal length f of the currently attached imaging lens 21 is inputted (step S130). The focal length among the focal lengths f_1 through f_3 selected by the focal point selection lever 90h is inputted. The inputted focal length f is used to set the adjustment magnification B with reference to the magnification rule Rb (step S140). The operation amount So of the distance ring 21c is then inputted from the roller position sensor 29a (step S150), and the inputted operation amount So is used to set the cutout position K with reference to the cutout rule Rk (step S160).

[0032] When the adjustment magnification B and the cutout position K are thus set, a partial image GSp is cut out from a cutout region having a size based on the adjustment magnification B, at a position based on the cutout position K in the sub-image GS (step S170), and a size

adjustment in accordance with the adjustment magnification B is applied to the cut-out partial image GSp (step S180). Since the adjustment magnification B is set by referencing the magnification rule Rb using the focal length f , the subject appearing in the size-adjusted partial image GSp is of the same size as the subject appearing in the main image GM. A viewfinder image GF is generated, wherein the partial image GSp, the size of which has been adjusted as described above, is superimposed in the center of the main image GM (step S190). The viewfinder image GF is generated by generating pixel values of the superimposed portion by alpha blending in which the pixel values s of the partial image GSp and the pixel values m of the main image GM are mixed based on a coefficient α for indicating the transparency of the top sub-image GS with respect to the bottom main image GM. The pixel values m of the main image GM are used to generate the portion outside the superimposed portion. FIG. 8 is a view showing the generated viewfinder image GF. As shown in FIG. 8, the superimposed portion of the viewfinder image GF is generated as a double image by alpha blending. In the superimposed portion, the partial image GSp cut out from the sub-image GS is indicated by solid lines, and the main image GM is indicated by dotted lines.

[0033] When the viewfinder image GF is generated in this manner, the generated viewfinder image GF is displayed in the EVF 82 (step S200), the process returns to step S100 and repeats. The magnification rule Rb is referenced using the focal length f of the imaging lens 21 to set the adjustment magnification B , the cutout rule Rk is referenced using the operation amount S_o from the roller position sensor 29a, which reflects the focus position of the main electronic imaging unit 20, to set the cutout position K , and the partial image GSp cut out from the set cutout position K is adjusted in size in accordance with the adjustment magnification B , after which a viewfinder image GF can be displayed, wherein the partial image GSp is superimposed on the main image GM. A viewfinder image GF can therefore be generated, wherein the double image of the superimposed portion changes in conjunction with adjusting the focus of the main electronic imaging unit 20. FIG. 9 is a view showing the relationship between the misalignment of the viewfinder image GF and the focus. In FIG. 9(b), there is no misalignment in the superimposed portion, but this means that a partial image GSp of the correct position is cut out from the subject image in the sub-image GS, and the subject is in focus. In FIGS. 9(a) and 9(c), however, the misalignment which occurs in the superimposed portion means that a partial image

GSp of an offset position is cut out from the subject image in the sub-image GS, and the subject is out of focus. In FIG. 9(a), the focus is shifted inward from the subject, and in FIG. 9(c), the focus is shifted in front of the subject. The user can thus adjust the focus while confirming the misalignment of the superimposed portion of the viewfinder image GF. Since the partial image GSp is superimposed in the viewfinder image GF by primarily using the main image GM in this instance, a viewfinder image GF can be generated. There is no parallax in the viewfinder image GF with respect to the main image GM. Since the partial image GSp is also superimposed on the main image GM after the focal length f of the currently attached imaging lens 21 is used to adjust the size of the partial image GSp, no size difference occurs between the images in the superimposed portion.

[0034] The operation of the digital camera 10 during correction of the magnification rule Rb by the user will next be described. FIG. 10 is a view showing an example of the correction processing routine executed by the main controller 30. This processing is executed when the correction mode is selected by operation of the mode selection button 90d by the user. In the following description, the cutout position K is assumed to be normal in the correction of the adjustment magnification B. When this correction processing routine is executed, the main controller 30 displays an instruction screen on the liquid crystal monitor 84 instructing the user to first place a target object M in a position at a reference distance L, and operate the distance ring 21c so that the distance scale thereof is at the rotation position indicating the distance L, and then to press the OK button 90e once the above operations are completed (step S300). The process then waits for the OK button 90e to be operated by the user (step S310). When the OK button 90e is operated, the focal length f of the currently attached imaging lens 21 is inputted (step S320). As described above, the focal length selected by the focal point selection lever 90h is inputted. When the focal length f is thus inputted, a viewfinder image GF is generated in accordance with the current adjustment magnification B and cutout position K (step S340). This processing is performed in the same manner as the viewfinder image display processing routine described above. The adjustment magnification B at this time is a magnification which is set by using the inputted focal length f to reference the magnification rule Rb. A viewfinder image GF' in which the superimposed portion of the generated viewfinder image GF is enlarged is then displayed in the EVF 82 (step S350). FIG. 11 is a view showing an example of the viewfinder

image GF' in the correction mode. As shown in FIG. 11, the superimposed portion is enlarged in the display, and a message is displayed indicating that adjustment is in progress. Under ordinary circumstances, a viewfinder image GF' is displayed, wherein there is no size difference in the superimposed portion, as shown in FIG. 11(b). However, when the positions of the main electronic imaging unit 20 and sub-electronic imaging unit 40 are offset due to some abnormality, a size difference can occur in the superimposed portion, as shown in FIG. 11(a).

[0035] When the viewfinder image GF' is thus displayed, the process waits for an adjustment operation by the JOG dial 90g (step S360) or operation of the OK button 90e (step S370). When an adjustment operation occurs, a determination is made as to whether the adjustment is for enlargement or reduction (step S380). For example, when the JOG dial 90g is rotated to the right, the adjustment is determined to be for enlargement, and when the JOG dial 90g is rotated to the left, the adjustment is determined to be for reduction. When the adjustment is determined to be for enlargement, a magnification change amount Δb having a positive value is set in accordance with the operation amount of the JOG dial 90g (step S390), and when the adjustment is determined to be for reduction, a magnification change amount Δb having a negative value is set in accordance with the operation amount of the JOG dial 90g (step S400). The magnification change amount Δb is added to the current adjustment magnification B to change the adjustment magnification B (step S410).

[0036] When the adjustment magnification B is changed in this manner, the process returns to step S340 and repeats, so that adjustment operations from the user are repeatedly received until a size difference in the viewfinder image GF' is no longer confirmed. When a determination is made in step S370 that the OK button 90e has been operated, a confirmation message inquiring whether to correct the magnification rule Rb according to the current adjustment magnification B is displayed in the EVF 82 (step S430), and the process waits for a button operation (step S440). When the cancel button 90f is operated in step S440, the process returns to step S340 and repeats. On the other hand, when the OK button 90e is pressed in step S440, the magnification rule Rb is corrected by using a magnification change amount ΔB (the cumulative value of the magnification change amount Δb) as a correction value for the inputted focal length f (step S450), and the routine is completed. Now, we think about a case in which the inputted focal length f is the focal length f2, for example, for the correction of the magnification rule Rb. In this case, the

magnification change amount ΔB is first added as the correction amount to the adjustment magnification B2 of the focal length f2. For the adjustment magnification B1 of the focal length f1, a magnification change amount ΔB which is in accordance with the ratio of the adjustment magnification B2 and the adjustment magnification B1 is added as the correction amount. The same principle applies for the adjustment magnification B3 of the focal length f3. It is thus possible for the user to correct the magnification rule Rb by a simple method. A magnification change amount ΔB may also be acquired for each of a plurality of focal lengths, and the magnification rule Rb may be corrected based on the acquired magnification change amounts ΔB .

[0037] The magnification rule Rb of the digital camera 10 at the time of shipping reflects individual differences in each digital camera 10, and is registered in the process of manufacturing the digital camera 10. This process will be described hereinafter along with the method for manufacturing the digital camera 10. FIG. 12 is a view showing an example of the manufacturing process of the digital camera 10. In the manufacturing process of the digital camera 10, the constituent parts are first assembled in the main body 12 (step S500). In this assembly step, the main electronic imaging unit 20, the sub-electronic imaging unit 40, the image processor 70, the display controller 80, the EVF 82, the liquid crystal monitor 84, the operating switch group 90, the main controller 30, and other components are installed in the main body 12. At this time, a default adjustment magnification for each focal length is registered as the magnification rule Rb in the flash memory 38. When the digital camera 10 is thus assembled, preparation is made for generating the magnification rule Rb (step S510). In this preparation step, a power button (not shown) of the digital camera 10 is switched on, the digital camera 10 is fixed to a tripod or the like, a target object M is placed in a position at a predetermined distance L from the fixed digital camera 10, the focal point selection lever 90h is operated to coincide with the focal length f (the focal length f1 in this case) of the currently attached imaging lens 21, and the distance ring 21c is rotated to the position at which the distance scale indicated thereon shows the distance L. At this time, the switching on of the power button of the digital camera 10 causes the viewfinder image display processing routine described above to be executed. A viewfinder image GF generated in accordance with the default adjustment magnification corresponding to the cutout position K and the focal length f1 is therefore displayed in the EVF 82.

[0038] When the viewfinder image GF is thus displayed, the size difference of the superimposed portion of the displayed viewfinder image GF is confirmed (step S520). A slight size difference may occur in the superimposed portion at this time due to individual differences between digital cameras 10. Individual differences between digital cameras 10 occur due to manufacturing or assembly error in the main electronic imaging unit 20, the sub-electronic imaging unit 40, and other parts, or to such factors as the characteristics of the image sensors 22, 42. When a size difference is confirmed in the confirmation step, magnification adjustment is performed until the size difference can no longer be confirmed (step S530). This magnification adjustment is performed in the same manner as the adjustment processing in the correction processing routine shown in FIG. 10. When a size difference can no longer be confirmed, a magnification rule Rb is generated using the adjustment amount for the focal length f1 and registered in the flash memory 38 (step S540). The magnification rule Rb is generated in the same manner as the magnification rule Rb is corrected in the correction processing routine shown in FIG. 10, by adding the adjustment amount for the focal length f1 in accordance with the ratio thereof to the adjustment magnification for each focal length. Size differences that accompany individual differences due to assembly error and other factors in the digital camera 10 can thereby be eliminated, and a highly precise magnification rule Rb can be generated and registered.

[0039] The correlation between constituent elements of the present embodiment and constituent elements of the present invention will next be clarified. The EVF 82 of the present embodiment is an example of an image display unit. The main electronic imaging unit 20 is an example of a main imaging unit. The sub-electronic imaging unit 40 is an example of a sub-imaging unit. The focal point selection lever 90h is an example of the focal length acquiring unit. The main controller 30 is an example of the magnification setting unit. The combination of the main controller 30 and image processor 70 is an example of a composite image generation unit. The display controller 80 is an example of the display control unit. The JOG dial 90g is an example of the instruction receiving unit. The main controller 30 is an example of the correcting unit.

[0040] According to the digital camera 10 of the present embodiment described in detail above, the focal length f of the currently attached imaging lens 21 is acquired, the magnification rule Rb is referenced using the acquired focal length f to set an adjustment magnification B, the

size of a partial image GSp cut out from a predetermined position of the sub-image GS is adjusted in accordance with the set adjustment magnification B so as to be the same size as the main image GM, a viewfinder image GF is then generated by superimposing the partial image GSp on the main image GM. The generated viewfinder image GF is displayed in the EVF 82. A viewfinder image GF in which the two images are superimposed can therefore be generated and displayed by a simple configuration without the use of a complex mechanism.

[0041] By configuring the correction mode so that the magnification rule Rb is corrected in accordance with a magnification change amount set by a user operation, the magnification rule Rb can be corrected by the user. Since the superimposed portion of the viewfinder image GF' in the correction mode is enlarged in the display, size difference is easily confirmed, and the magnification rule Rb can be smoothly corrected. Furthermore, since the operation amount So of manual focusing is acquired to set the cutout position K of the partial image GSp with reference to the cutout rule Rk, it is possible to confirm whether the subject is in focus by confirming positional misalignment of the superimposed portion.

[0042] The present invention shall not be construed as being limited by the embodiment described above, and various embodiments of the present invention are possible within the technical scope of the present invention.

[0043] In the embodiment described above, the viewfinder image GF is displayed in the EVF 82, but the present invention is not limited to this configuration, and the viewfinder image GF may be displayed on the liquid crystal monitor 84.

[0044] In the embodiment described above, a correction amount for a single focal length is reflected for each focal length, but the present invention is not limited to this configuration, and a configuration in which the result of adjusting the adjustment magnification B for each focal length is reflected for each focal length may be available.

[0045] In the embodiment described above, a partial image GSp is cut out from the sub-image GS, and the size of the partial image GSp is adjusted, but the present invention is not limited to this configuration. The partial image GSp can be cut out after the size of the sub-image GS is first adjusted. Size adjustment is also not limited to being performed for the sub-image GS, and may also be performed for the main image GM.

[0046] In the embodiment described above, a case in which the sub-image GS is of a smaller size than the main image GM is described, but the present invention is not limited to this configuration, and the sub-image GS and the main image GM may be the same size, or the sub-image GS may be larger than the main image GM. The partial image GSp cut out from the sub-image GS is also described above as being combined with the main image GM, but the sub-image GS may also be combined without having a partial image cut therefrom.

[0047] In the embodiment described above, the focal length f of the imaging lens 21 is selected from three focal lengths f_1 through f_3 by the focal point selection lever 90h, but the present invention is not limited to this configuration, and the focal length f may be selected from four or more focal lengths. Alternatively, a configuration in which the user inputs a numerical value for the focal length may be available. The focal length may be acquired by using an electrical communication means or the like from the imaging lens 21 without the intervention of the user. The imaging lens 21 may also be a zoom lens, and when a zoom lens is attached, the focal length at that time is preferably downloaded by an electrical communication means or the like to set the adjustment magnification B . When a zoom lens is attached, the magnification rule R_b should be continuously changed, and when the magnification rule R_b is stored as a relational expression to calculate the magnification, the adjustment magnification B is preferably calculated by using the relational expression.

[0048] In the embodiment described above, the amount of rotation of the distance ring 21c is detected via the coupled roller 29, but the amount of rotation may also be directly detected by detecting the rotation angle of the distance ring 21c.

[0049] In the embodiment described above, the magnification rule R_b is a rule in which the focal length f and the magnification are correlated, but the magnification rule R_b may be a rule in which the focal length f , the distance to the subject acquired from the roller position sensor 29a, and the magnification are correlated. Through this configuration, even when the size of the subject appearing in the main image GM is dependent on the distance to the subject, it is possible to match the size of the subject image in the partial image GSp and the size of the subject image in the main image GM.

[0050] In the embodiment described above, the viewfinder image GF is generated by using α blending to superimpose the partial image GSp on the main image GM without modification

thereof, but a configuration in which the viewfinder image GF is generated by using α blending to superimpose the partial image GSp on the main image GM after changing the color of at least one of the partial image GSp and the main image GM may be available. In this case, the partial image GSp or the image of the superimposed portion of the main image GM may be displayed in monochrome or in an amber color or other color. The partial image GSp and the image of the superimposed portion of the main image GM can thereby be more easily distinguished.

[0051] In the embodiment described above, the cutout position K and the cutout region are established without consideration for rotation about the optical axis in the main electronic imaging unit 20 or the sub-electronic imaging unit 40, but a configuration in which the cutout position K and cutout region reflect rotation about the optical axis in the main electronic imaging unit 20 or the sub-electronic imaging unit 40 may be available, and misalignment in the rotation direction does not occur in the superimposed portion when the subject is in focus. In this case, the cutout rule Rk preferably includes information corresponding to the rotation.

[0052] In the embodiment described above, adjustment during generation or correction of the magnification rule Rb is performed based on manual operation of the JOG dial 90g by an operator or user, but the present invention is not limited to this configuration, and adjustment may also be performed automatically. For example, an auto-focusing operation can be employed instead of the manual focusing operation. The same images include the main image GM, the sub-image GS, and the composite image can be displayed on a camera which performs the auto-focusing operation.

[0053] Next, a method for manufacturing a digital camera 10 is described. The method is for manufacturing the digital camera 10 with a manual focusing function and of a focal length varying function of a main lens. The method for manufacturing the digital camera 10 includes an assembly step, a preparation step, an adjustment step, and a registration step.

[0054] The assembly step is for assembling image display means for displaying an image, main imaging means for applying a photoelectric conversion to an image of a subject obtained via a main lens (imaging lens 21) and generating a main image GM, sub-imaging means for applying a photoelectric conversion to an image of a subject obtained via a sub-lens 41 and generating a sub-image GS, focal length acquiring means for acquiring the focal length of the main lens 21, magnification setting means for setting the magnification of the image on the basis

of the acquired focal length of the main lens 21 so that the image of the subject in the main image GM and the image of the subject in the sub-image GS are substantially the same size, composite image generating means for generating a composite image in which the main image GM and the sub-image GS are superimposed, in conjunction with zoom processing of at least one of the main image GM and the sub-image GS at the set magnification, display control means for controlling the display means so as to display the generated composite image, and storage means for storing various types of data.

[0055] The preparation step of changing the focal length of the main lens 21 to a predetermined focal length.

[0056] The adjustment step is for performing an adjustment with respect to the set magnification so that the size difference is less than or equal to a predetermined value when the composite image is generated by the composite image generating means and a size difference is identified in the generated composite image.

[0057] The registration step is for generating a magnification rule in which the predetermined focal length and the magnification are correlated, and registering the generated magnification rule in the storage means on the basis of the magnification that is set when the size difference is less than or equal to a predetermined value.

GENERAL INTERPRETATION OF TERMS

[0058] In understanding the scope of the present invention, the term “comprising” and its derivatives, as used herein, are intended to be open ended terms that specify the presence of the stated features, elements, components, groups, integers, and/or steps, but do not exclude the presence of other unstated features, elements, components, groups, integers and/or steps. The foregoing also applies to words having similar meanings such as the terms, “including”, “having” and their derivatives. Also, the terms “part,” “section,” “portion,” “member” or “element” when used in the singular can have the dual meaning of a single part or a plurality of parts. Finally, terms of degree such as “substantially”, “about” and “approximately” as used herein mean a reasonable amount of deviation of the modified term such that the end result is not significantly changed. For example, these terms can be construed as including a deviation of at least $\pm 5\%$ of the modified term if this deviation would not negate the meaning of the word it modifies.

[0059] While only selected embodiments have been chosen to illustrate the present invention, it will be apparent to those skilled in the art from this disclosure that various changes and modifications can be made herein without departing from the scope of the invention as defined in the appended claims. Furthermore, the foregoing descriptions of the embodiments according to the present invention are provided for illustration only, and not for the purpose of limiting the invention as defined by the appended claims and their equivalents.

WHAT IS CLAIMED IS:

1. A digital camera having a focusing function and a focal length varying function of a main lens, the digital camera comprising:

a main imaging unit configured to generate a main image by performing a photoelectric conversion from a subject obtained via the main lens;

a sub-imaging unit configured to generate a sub-image by performing a photoelectric conversion from the subject obtained via a sub-lens;

a focal length acquiring unit configured to acquire the focal length of the main lens;

a magnification setting unit configured to set a level of magnification on the basis of the focal length;

a composite image generating unit configured to generate a composite image by combining the main image and the sub-image, after at least one of the main image and the sub-image is magnified at the level of magnification; and

an image display unit configured to display the composite image.

2. The digital camera according to claim 1, wherein
the magnification setting unit is configured to set the level of the magnification in order to match substantially a size of the main image and a size of the sub-image.

3. The digital camera according to claim 2, wherein
the sub-lens is a pan-focus lens.

4. The digital camera according to claim 2, wherein
the magnification setting unit is configured to set the level of the magnification in a correction mode in which a predetermined magnification rule applies in setting the level of the magnification, and
the digital camera further includes
an instruction receiving unit configured to receive an instruction to change the level of the magnification such that difference between the size of the main image and the size of the sub-

image in the composite image is less than or equal to a predetermined amount in the correction mode, and

a correcting unit configured to correct the magnification rule by using amount to change the level of the magnification as amount of correction in the correction mode, when the focal length of the main lens is in predetermined length.

5. The digital camera according to claim 1, further comprising
an focusing amount acquiring unit configured to acquire amount of the focusing, wherein
the composite image generating unit is configured to generate the composite image by
combining the main image and the sub-image by setting a cutout position on the sub-image,
cutting out a partial image from the cut out position, and adding the partial image on the main
image, and

misalignment of the composite image decreases as the composite image is in focus with
the subject on the basis of the amount and a predetermined cutout rule.

6. The digital camera according to claim 5, wherein
the predetermined cutout rule is based on a principle of triangulation based on an interval
between the main lens and the sub-lens, and distance from the digital camera to the subject on the
basis of the amount.

DIGITAL CAMERA AND METHOD FOR MANUFACTURING SAME

Abstract

A digital camera is provided with a focusing function and a focal length varying function of a main lens. The digital camera includes a main imaging unit configured to generate a main image by performing a photoelectric conversion from a subject obtained via the main lens, a sub-imaging unit configured to generate a sub-image by performing a photoelectric conversion from the subject obtained via a sub-lens, a focal length acquiring unit configured to acquire the focal length of the main lens, a magnification setting unit configured to set a level of magnification on the basis of the focal length, a composite image generating unit configured to generate a composite image by combining the main image and the sub-image, after at least one of the main image and the sub-image is magnified at the level of magnification, and an image display unit configured to display the composite image.

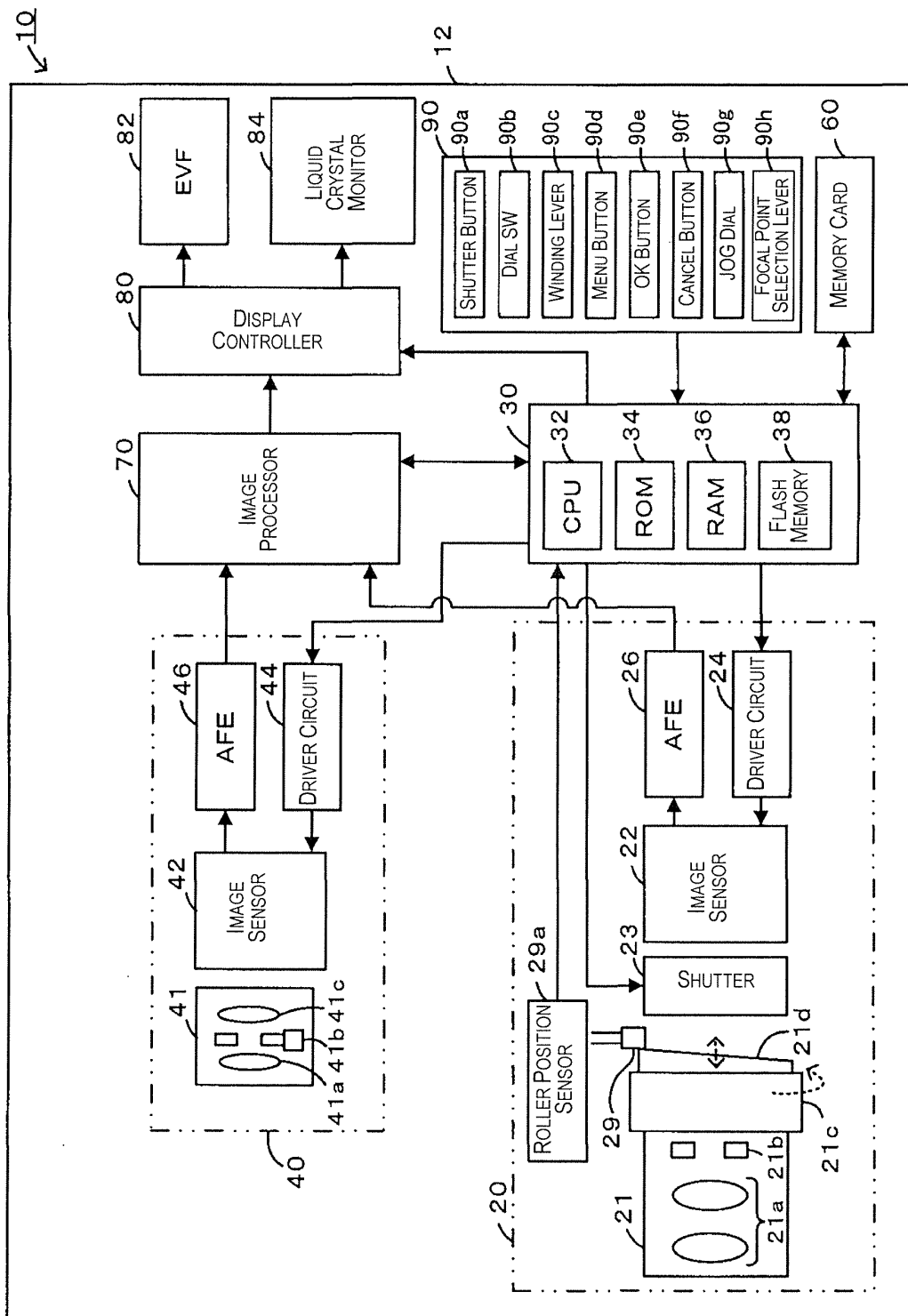


Fig.1

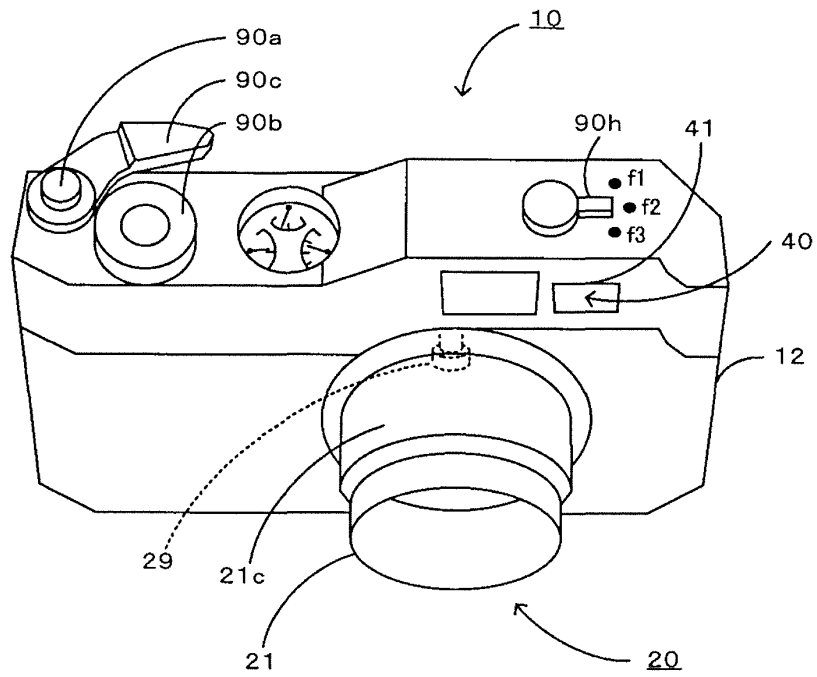


Fig. 2

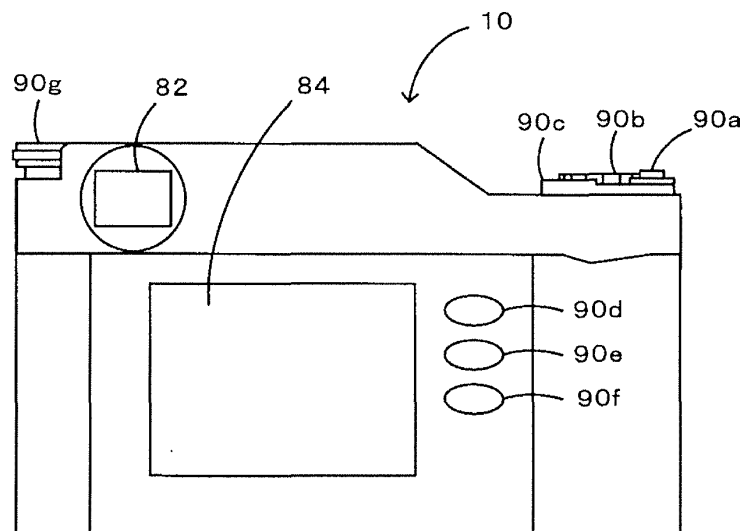


Fig. 3

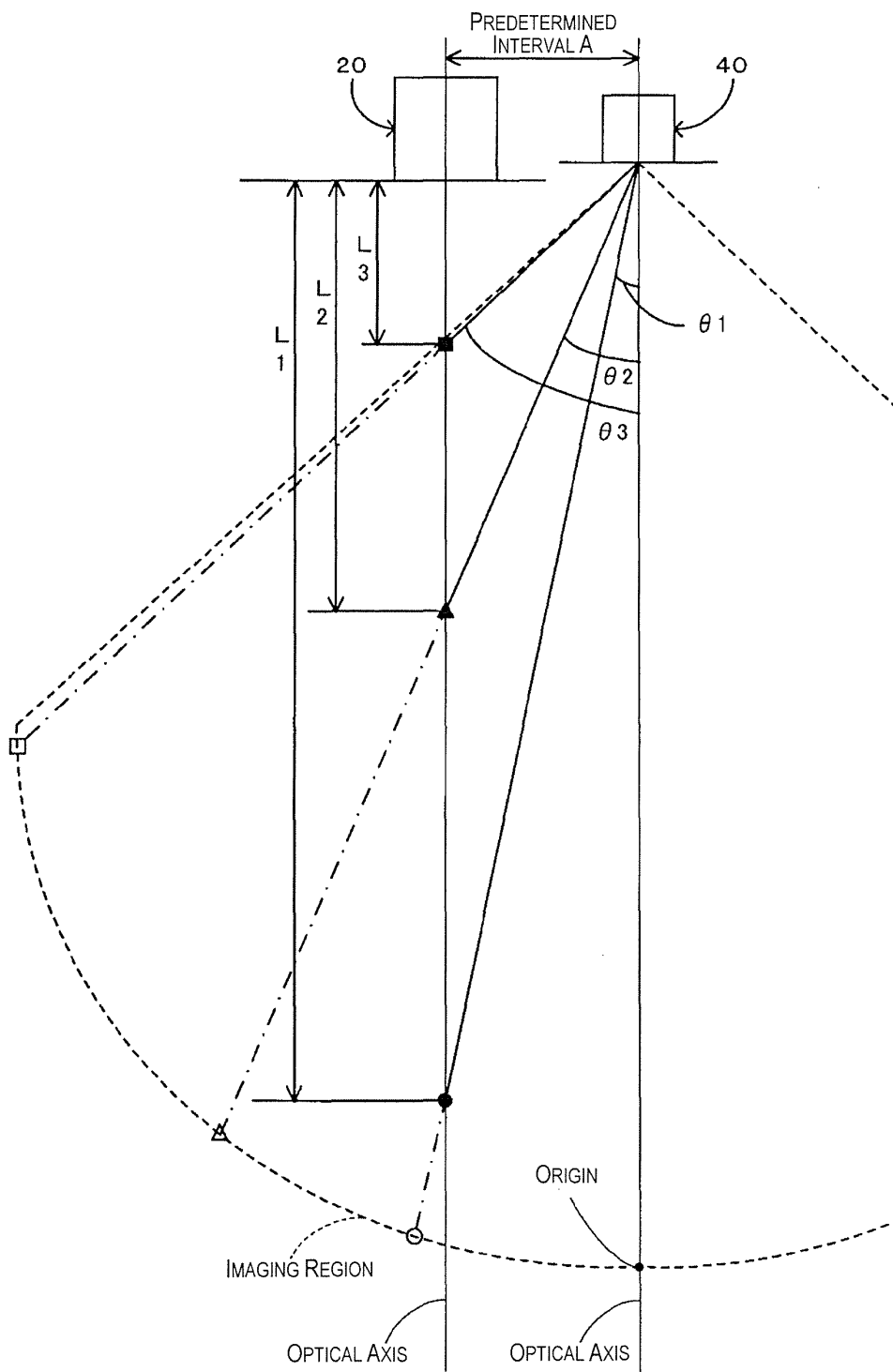


Fig. 4

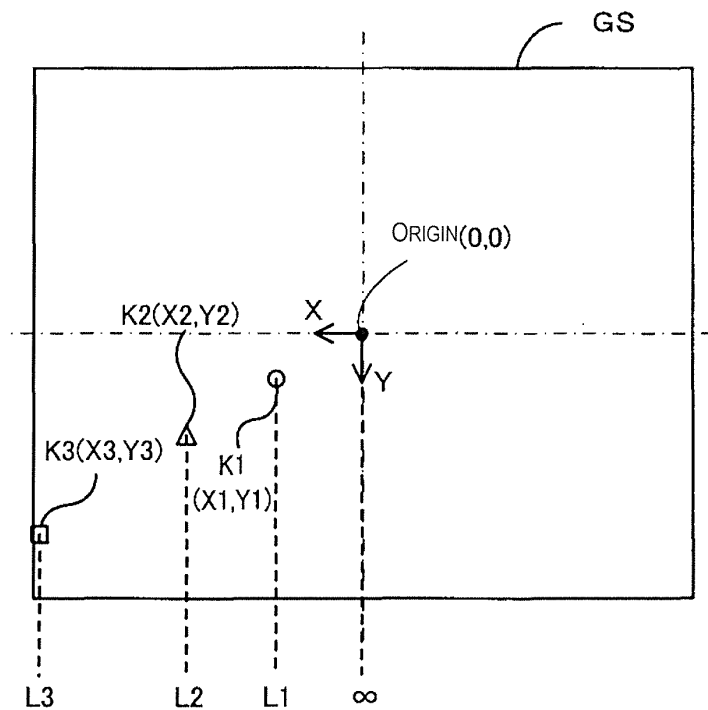


Fig. 5

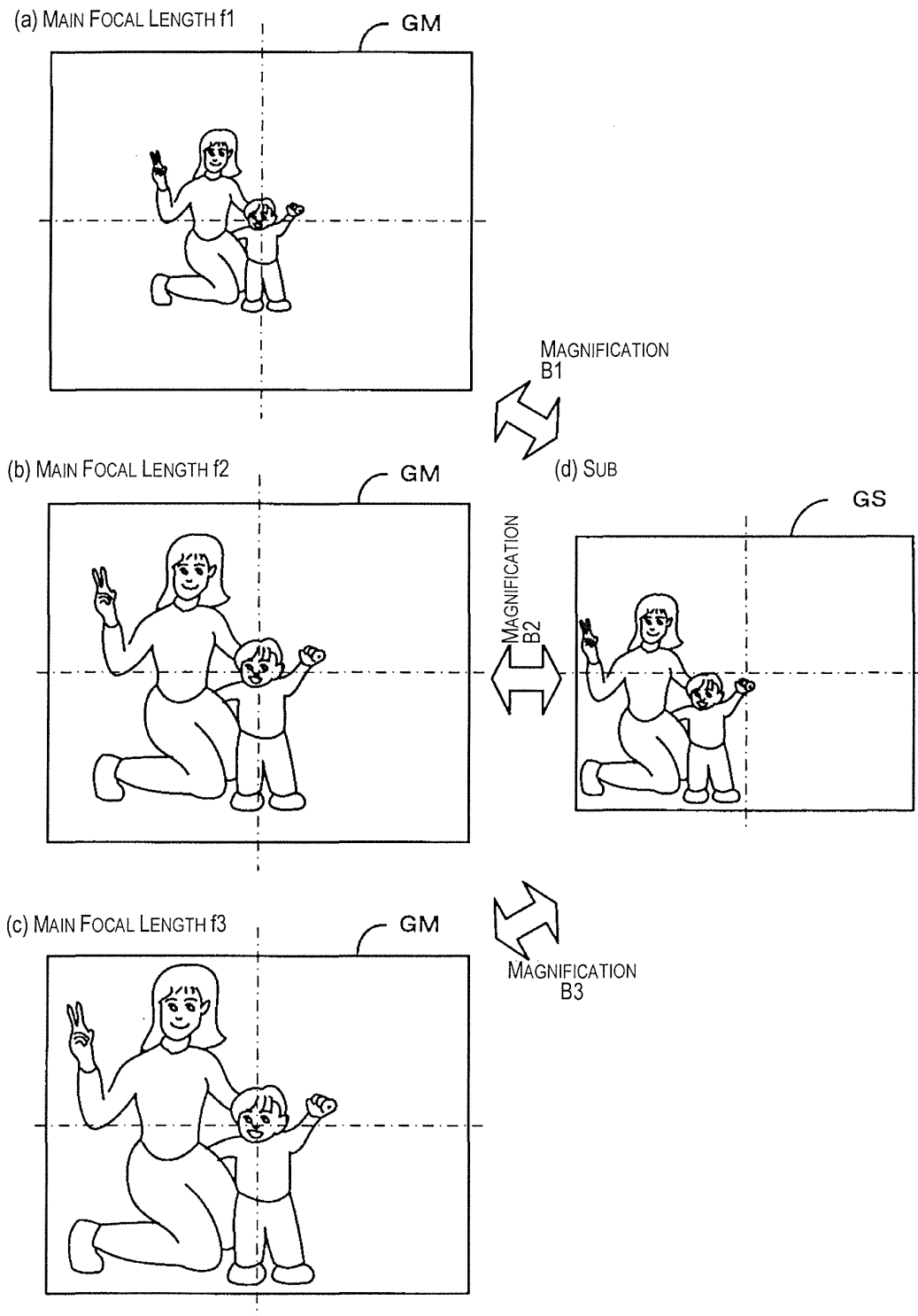


Fig. 6

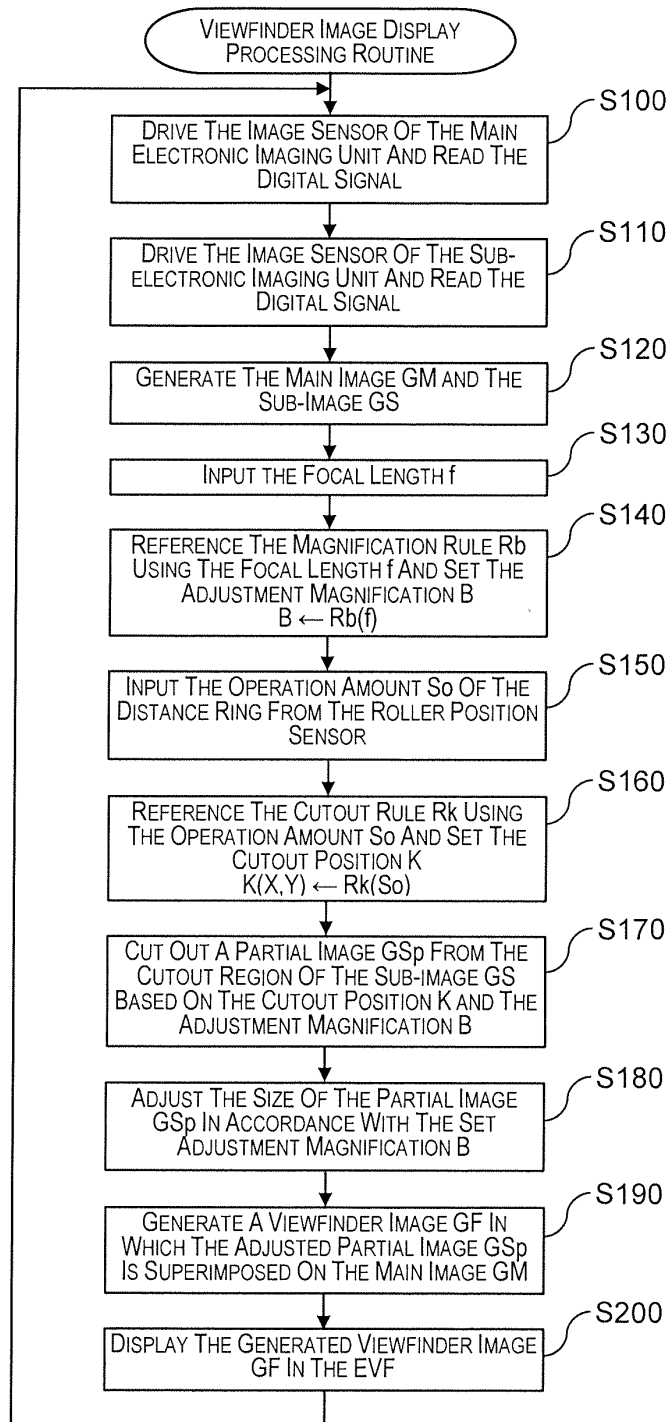


Fig. 7

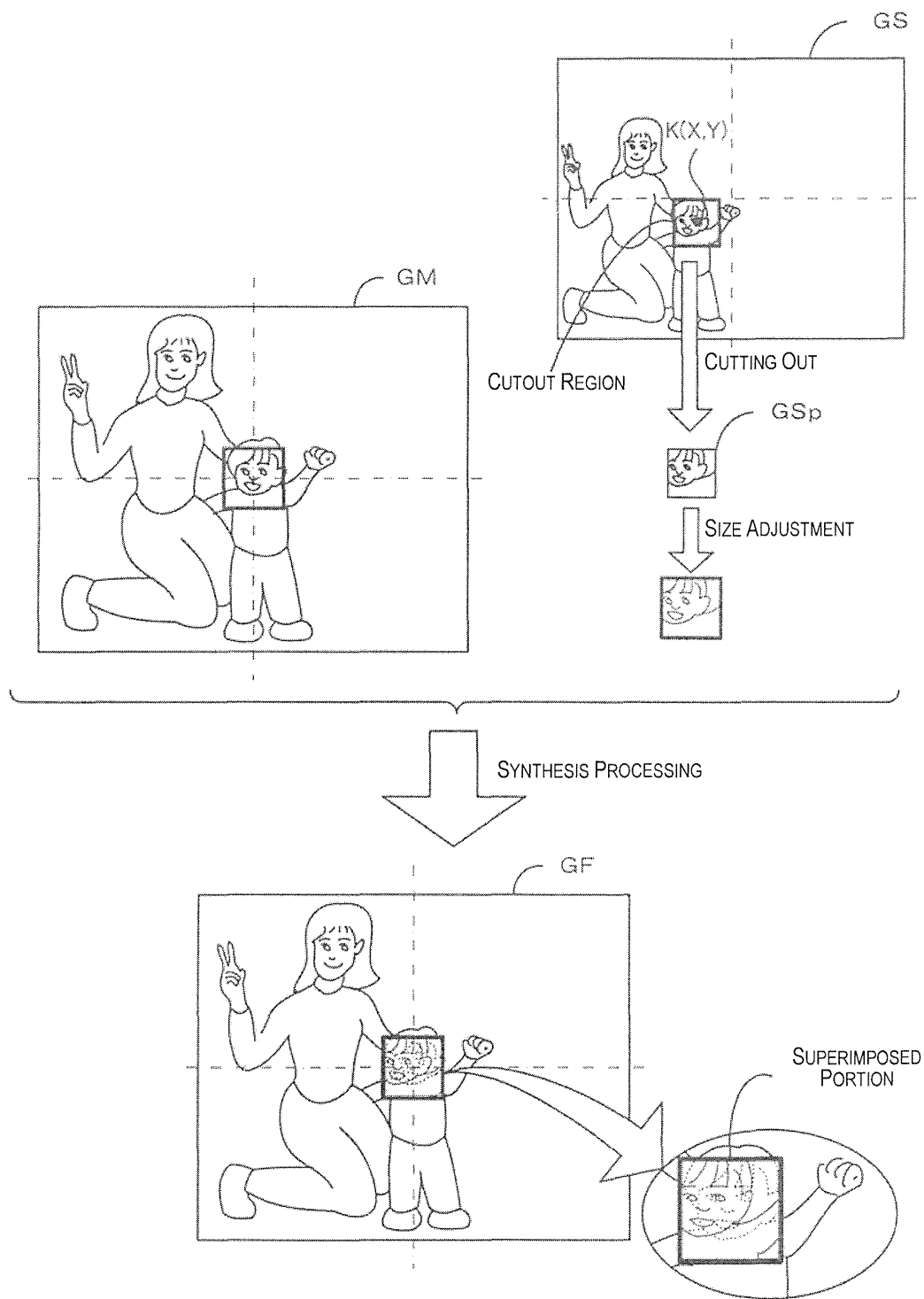


Fig. 8

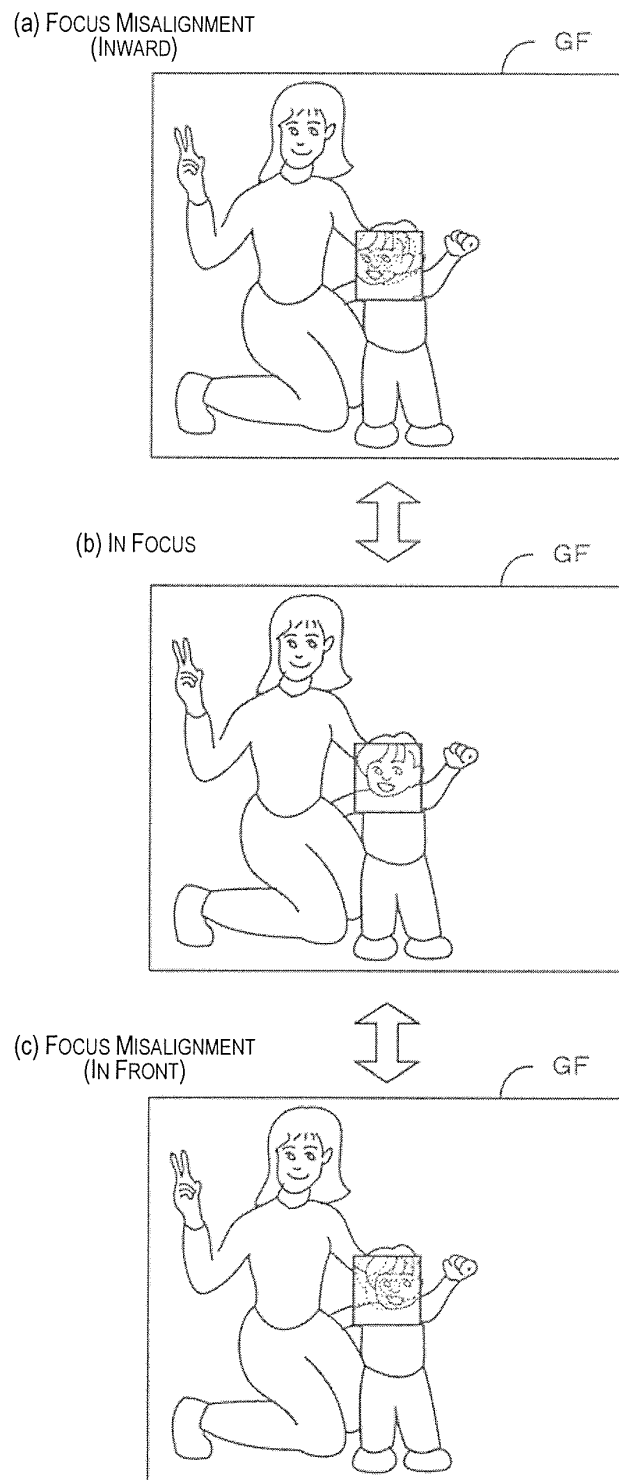
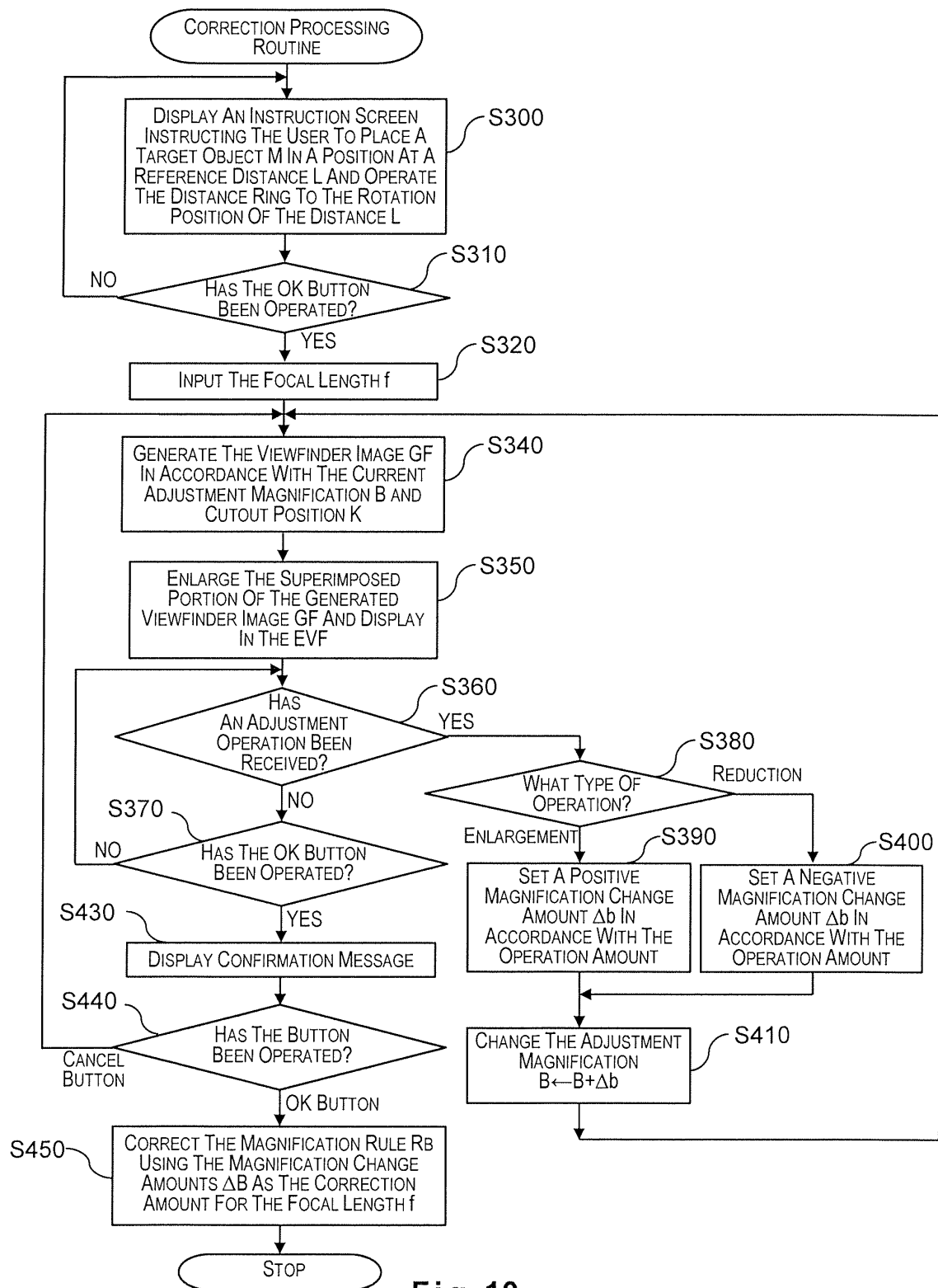


Fig. 9



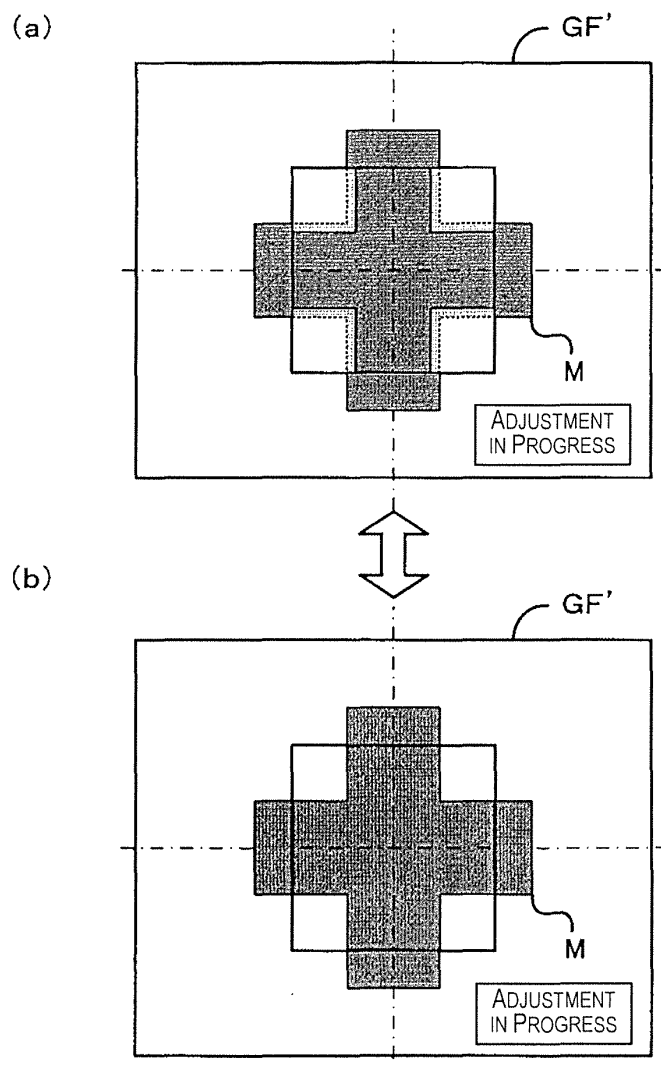


Fig. 11

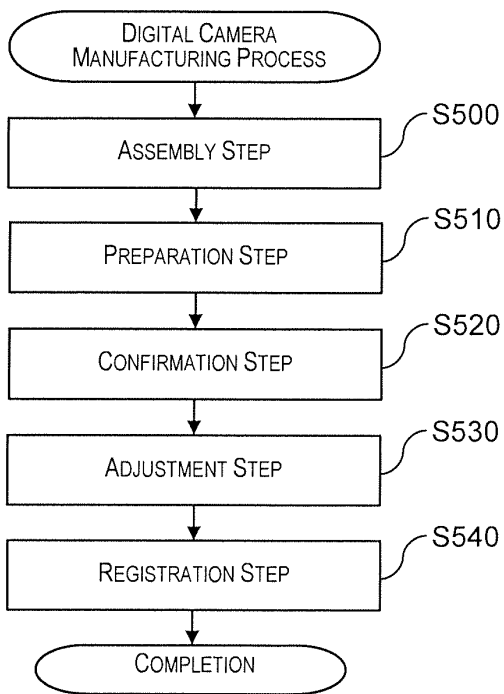


Fig. 12

Under the Paperwork Reduction Act of 1995, no persons are required to respond to collection of information unless it displays a valid OMB control number.

SEIKO EPSON Ref. No.: J0152869US01

Attorney's Ref. No.: SE-US105228

Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は、下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name.

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

デジタルカメラおよびその製造方法

DIGITAL CAMERA AND METHOD FOR MANUFACTURING SAME

上記発明の明細書（下記の欄で×印がついていない場合は、本書に添付）は、

the specification of which is attached hereto unless the following box is checked:

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☐ was filed on _____ as United States Application Number or PCT International Application Number and was amended on _____ (if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

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I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

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Japanese Language Declaration

(日本語宣言書)

私は、米国法典第35編119条(a)-(d)項又は365条(b)項に基づき下記の、米国以外の国の少なくとも1ヶ国を指定している特許協力条約365条(a)項に基づく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している、本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。

I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)
外国での先行出願

Priority Not Claimed
優先権主張なし

2009-295202	Japan	25/December/2009
(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)

(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)
------------------	-------------------	-----------------------------------

私は、第35編米国法典119条(e)項に基づいて下記の米国特許出願規定に記載された権利をここに主張いたします。

I hereby claim the benefit under Title 35, United States Code, Section 119 (e) of any United States provisional application(s) listed below.

(Application No.) (出願番号)	(Filing Date) (出願日)
-----------------------------	------------------------

私は下記の米国法典第35編120条に基づいて下記の米国特許出願に記載された権利、又は米国を指定している特許協力条約365条(c)に基づく権利をここに主張します。また、本出願の各請求範囲の内容が米国法典第35編112条第1項又は特許協力条約で規定された方法で先行する米国特許出願に開示されていない限り、その先行米国出願書提出日以降で本出願書の日本国内または特許協力条約国際提出日までの期間中に入手された、連邦規則法典第37編1章56項で定義された特許資格の有無に関する重要な情報について開示義務があることを認識しています。

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365 (c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application:

(Application No.) (出願番号)	(Filing Date) (出願日)
-----------------------------	------------------------

(Application No.) (出願番号)	(Filing Date) (出願日)
-----------------------------	------------------------

私は、自身の知識に基づいて本宣言書中で私が行なう表明が真実であり、かつ私が入手した情報と私の信じているところに基づく表明が全て真実であると信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第18編第1001条に基づき、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の声明を行えば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

(Status: Patented, Pending, Abandoned)
(現況: 特許許可済、係属中、放棄済)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Japanese Language Declaration

(日本語宣言書)

委任状： 私は本出願を審査する手続を行い、且つ米国特許商標庁との全ての業務を遂行するために、記名された発明者として、
カスタマーナンバー： [22919]に付随した弁護士及び/または弁理士を任命する。

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or patent agent(s) associated with the Customer Number: [22919] to prosecute this application and transact all business in the Patent and Trademark Office.

書類送付先：

Send Correspondence to:

2291922919

直接電話連絡先： (名前及び電話番号)

Direct Telephone Calls to: (name and telephone number)

唯一または第一発明者名

Full name of sole or first inventor

塩原 隆一

Ryuichi SHIOHARA

発明者の署名

日付

Inventor's signature

Date

塩原 隆一

2010年12月21日

Ryuichi Shiohara Dec. 21, 2010

住所

Residence

日本国

長野県

松本市

Hatsuyuta-shi, Nagano-ken, Japan

国籍

Citizenship

日本

Japan

私書箱

Post Office Address

392-8502 日本国長野県諏訪市大和三丁目3番5号
セイコーエプソン株式会社内c/o SEIKO EPSON CORPORATION
3-5, Owa 3-chome, Suwa-shi, Nagano 392-8502 Japan

第二共同発明者

Full name of second joint inventor, if any

第二共同発明者の署名

日付

Second inventor's signature

Date

住所

Residence

国籍

Citizenship

私書箱

Post Office Address

(第三以降の共同発明者についても同様に記載し、署名をすること)

(Supply similar information and signature for third and subsequent joint inventors.)

SE-US105228

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of :
Ryuichi SHIOHARA :
Serial No.: New Application :
Filed: Herewith :
For: DIGITAL CAMERA AND METHOD FOR :
MANUFACTURING SAME :

INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner of Patents
Washington, DC 20231

Sir:

In accordance with MPEP 609 and 37 C.F.R. §§ 1.56, 1.97 and 1.98, Applicant brings the reference listed on the attached PTO-1449-Form to the Examiner's attention and requests that it be considered and made of record in this application. A copy of the non-U.S. patent is attached.

This Information Disclosure Statement is being filed within three (3) months of the filing date of this application. Thus, *no fee is believed to be due for this Information Disclosure Statement*. However, the Commissioner is authorized to charge any fees associated with this communication or credit any overpayment to Deposit Account No. 50-1836.

Prompt examination on the merits is respectfully requested.

Respectfully submitted,

/Akiyoshi Onda/
Akiyoshi Onda
Reg. No. 63,773

GLOBAL IP COUNSELORS, LLP
1233 Twentieth Street, NW, Suite 700
Washington, DC 20036
(202)-293-0444
Dated: December 22, 2010

S:\12-DEC10-MSM\SE-US105228 new app\SE-US105228 IDS.doc

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

UTILITY PATENT APPLICATION TRANSMITTAL (Only for new nonprovisional applications under 37 CFR 1.53(b))	Attorney Docket No.	SE-US105228
	First Inventor	Ryuichi SHIOHARA
	Title	DIGITAL CAMERA AND METHOD FOR MANUF
	Express Mail Label No.	

APPLICATION ELEMENTS See MPEP chapter 600 concerning utility patent application contents.	ADDRESS TO: Commissioner for Patents P.O. Box 1450 Alexandria VA 22313-1450
1. ☒ Fee Transmittal Form (e.g., PTO/SB/17) 2. ☐ Applicant claims small entity status. See 37 CFR 1.27. 3. ☒ Specification [Total Pages <u>22</u>] Both the claims and abstract must start on a new page (For information on the preferred arrangement, see MPEP 608.01(a)) 4. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets <u>11</u>] 5. Oath or Declaration [Total Sheets <u>3</u>] a. ☒ Newly executed (original or copy) b. ☐ A copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional with Box 18 completed) i. ☐ DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b). 6. ☒ Application Data Sheet. See 37 CFR 1.76 7. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix) ☐ Landscape Table on CD 8. Nucleotide and/or Amino Acid Sequence Submission (if applicable, items a. – c. are required) a. ☐ Computer Readable Form (CRF) b. ☐ Specification Sequence Listing on: i. ☐ CD-ROM or CD-R (2 copies); or ii. ☐ Paper c. ☐ Statements verifying identity of above copies	ACCOMPANYING APPLICATION PARTS 9. ☐ Assignment Papers (cover sheet & document(s)) Name of Assignee _____ 10. ☐ 37 CFR 3.73(b) Statement (when there is an assignee) ☒ Power of Attorney 11. ☐ English Translation Document (if applicable) 12. ☒ Information Disclosure Statement (PTO/SB/08 or PTO-1449) ☒ Copies of citations attached 13. ☐ Preliminary Amendment 14. ☐ Return Receipt Postcard (MPEP 503) (Should be specifically itemized) 15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed) 16. ☐ Nonpublication Request under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent. 17. ☐ Other: _____
18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76: ☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____ Prior application information: _____ Examiner: _____ Art Unit: _____	

19. CORRESPONDENCE ADDRESS					
☒ The address associated with Customer Number: <u>22919</u> OR ☐ Correspondence address below					
Name	Global IP Counselors, LLP				
Address	1233 20th Street, N. W., Suite 700				
City	Washington	State	DC	Zip Code	20036
Country	USA	Telephone	202-293-0444	Email	
Signature	/Akiyoshi Onda/			Date	December 22, 2010
Name (Print/Type)	Akiyoshi Onda			Registration No. (Attorney/Agent)	63,773

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number

Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL For FY 2009

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 1,090.00

Complete if Known

Application Number New
Filing Date Herewith
First Named Inventor Ryuichi SHIOHARA
Examiner Name
Art Unit
Attorney Docket No. SE-US105228.

METHOD OF PAYMENT (check all that apply)

- ☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____
- ☒ Deposit Account Deposit Account Number: 50-1836 Deposit Account Name: Global IP Counselors, LLP
- For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)
- ☒ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, except for the filing fee
- ☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☒ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	330	165	540	270	220	110	1,090.00
Design	220	110	100	50	140	70	
Plant	220	110	330	165	170	85	
Reissue	330	165	540	270	650	325	
Provisional	220	110	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee (\$)	Small Entity Fee (\$)
Each claim over 20 (including Reissues)	52	26
Each independent claim over 3 (including Reissues)	220	110
Multiple dependent claims	390	195
Total Claims	Extra Claims	Fee (\$)
6 - 20 or HP = 0 x 52 =		
HP = highest number of total claims paid for, if greater than 20.		
Indep. Claims	Extra Claims	Fee (\$)
1 - 3 or HP = 0 x 220 =		
HP = highest number of independent claims paid for, if greater than 3.		
		Multiple Dependent Claims
		Fee (\$)
		390
		Fee Paid (\$)

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$270 (\$135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
33	0	0 / 50 =	270	

4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount)

Other (e.g., late filing surcharge):

SUBMITTED BY			
Signature	/Akiyoshi Onda/	Registration No. (Attorney/Agent)	63,773
Name (Print/Type)	Akiyoshi Onda	Telephone	202-293-0444
		Date	December 22, 2010

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 12/976,048				
APPLICATION AS FILED - PART I										
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY				
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)			
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	330			
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	540			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	220			
TOTAL CLAIMS (37 CFR 1.16(j))	6	minus 20 = *				x 52 =	0.00			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1	minus 3 = *				x 220 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$270 (\$135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL		TOTAL	1090			
APPLICATION AS AMENDED - PART II										
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OTHER THAN SMALL ENTITY		
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=		x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=		x	=
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE			TOTAL ADD'L FEE	
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=		x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=		x	=
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE			TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.										



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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/976,048	12/22/2010	2862	1090	SE-US105228	6	1

CONFIRMATION NO. 6698

22919
GLOBAL IP COUNSELORS, LLP
1233 20TH STREET, NW, SUITE 700
WASHINGTON, DC 20036-2680

FILING RECEIPT



OC000000045330246

Date Mailed: 01/10/2011

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Ryuichi SHIOHARA, Matsumoto, JAPAN;

Assignment For Published Patent Application

SEIKO EPSON CORPORATION, Tokyo, JAPAN

Power of Attorney: The patent practitioners associated with Customer Number 22919

Domestic Priority data as claimed by applicant

Foreign Applications

JAPAN 2009-295202 12/25/2009

Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper **Request to Retrieve Electronic Priority Application(s)** (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

If Required, Foreign Filing License Granted: 01/06/2011

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/976,048**

Projected Publication Date: 06/30/2011

Non-Publication Request: No

Early Publication Request: No

Title

DIGITAL CAMERA AND METHOD FOR MANUFACTURING SAME

Preliminary Class

396

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER**Title 35, United States Code, Section 184****Title 37, Code of Federal Regulations, 5.11 & 5.15****GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

page 2 of 3

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).



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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/976,048	12/22/2010	Ryuichi SHIOHARA	SE-US105228

CONFIRMATION NO. 6698

22919
GLOBAL IP COUNSELORS, LLP
1233 20TH STREET, NW, SUITE 700
WASHINGTON, DC 20036-2680

PUBLICATION NOTICE



OC000000048524321

Title:DIGITAL CAMERA AND METHOD FOR MANUFACTURING SAME

Publication No.US-2011-0157404-A1

Publication Date:06/30/2011

NOTICE OF PUBLICATION OF APPLICATION

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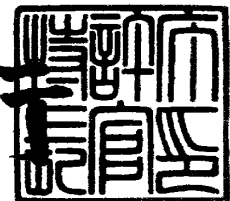
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【書類名】明細書

【発明の名称】デジタルカメラおよびその製造方法

【技術分野】

【0001】

本発明は、デジタルカメラおよびその製造方法に関し、詳しくは、マニュアルフォーカスが可能でメインレンズの焦点距離を変更可能なデジタルカメラおよびその製造方法に関する。

【背景技術】

【0002】

従来より、この種のカメラとしては、半透明鏡を含むファインダー光学系と、三角測量の原理を用いて撮影用レンズのマニュアルフォーカス操作に連動して回転する距離計光学系とからなる、いわゆる二重像合致式のレンジファインダーを備えるカメラが提案されている（例えば、特許文献1参照）。このようなカメラでは、ファインダー画像として、ファインダー光学系から入力されるファインダー像に距離計光学系から入力される距離計像を半透明鏡を介して重ね合わせた画像が用いられる。

【先行技術文献】

【特許文献】

【0003】

【特許文献1】特開2002-122907号公報

【発明の概要】

【発明が解決しようとする課題】

【0004】

上述したカメラでは、距離計光学系をマニュアルフォーカス操作に連動して精度よく回転させる必要があり、そのために複雑な機構が必要となる。そのような機構においては、機構を構成する各構成部品の製造公差やカメラへの組み付けに高い精度が要求され、組み付け時の調整作業も時間の掛かるものとなる。

【0005】

本発明は、簡易な仕組みで2つの画像を重ね合わせた合成画像を生成するデジタルカメラおよびその製造方法を提供することを主目的とする。

【課題を解決するための手段】

【0006】

本発明のデジタルカメラおよびその製造方法は、上述の主目的を達成するために以下の手段を採った。

【0007】

本発明のデジタルカメラは、マニュアルフォーカスが可能でメインレンズの焦点距離を変更可能なデジタルカメラであって、

画像を表示する画像表示手段と、

前記メインレンズを介して得られる被写体の像を光電変換してメイン画像を生成するメイン撮像手段と、

サブレンズを介して得られる被写体の像を光電変換してサブ画像を生成するサブ撮像手段と、

前記メインレンズの焦点距離を取得する焦点距離取得手段と、

前記取得されたメインレンズの焦点距離に基づいて、画像の倍率を設定する倍率設定手段と、

前記設定された倍率で前記メイン画像と前記サブ画像の少なくとも一方の画像の変倍処理を伴って、該メイン画像と該サブ画像とを重ね合わせた合成画像を生成する合成画像生成手段と、

該生成された合成画像を表示するよう前記表示手段を制御する表示制御手段とを備えることを要旨とする。

【0008】

この本発明のデジタルカメラでは、メインレンズの焦点距離を取得し、取得されたメインレンズの焦点距離に基づいて画像の倍率を設定し、設定された倍率でメイン画像とサブ画像の少なくとも一方の画像の変倍処理を伴ってメイン画像とサブ画像とを重ね合わせた合成画像を生成し、生成された合成画像を表示するよう表示手段を制御する。これにより、簡易な仕組みでメイン画像とサブ画像とを重ね合わせた合成画像を生成することができる。なお、メインレンズの焦点距離は、メインレンズを焦点距離の異なるものに交換することにより変更するものとしてもよいし、焦点距離を変更可能なズームレンズを用いることにより変更するものとしてもよい。

【0009】

また、本発明のデジタルカメラにおいて、前記倍率設定手段は、前記メイン画像の被写体の像と前記サブ画像の被写体の像とが略同じ大きさとなるよう倍率を設定する手段であるものとすることもできる。こうすれば、両画像の比較を容易に行なうことができる。この態様の本発明のデジタルカメラにおいて、前記サブレンズとしてパンフォーカスレンズが取り付けられてなるものとすることもできる。こうすれば、サブレンズの焦点距離が固定となるため、メインレンズの焦点距離に基づいて簡易な処理で画像の倍率を設定することができる。また、前記メインレンズの焦点距離を所定の焦点距離とした際の前記合成画像における大きさのずれの確認を伴って画像の倍率を設定するための所定の倍率規則の補正が可能な補正用モードを有するこの態様の本発明のデジタルカメラにおいて、前記補正用モードにおいて、前記合成画像における大きさのずれが所定の程度以下となるよう前記設定された倍率に対する変更の指示を受け付ける指示受付手段と、前記補正用モードにおいて、前記受け付けられた倍率の変更量を前記所定の焦点距離における補正量として用いて前記倍率規則を補正する補正手段とを備えるものとすることもできる。こうすれば、簡易な処理でユーザーによる倍率規則の補正を可能とすることができる。なお、「所定の程度以下」には、大きさのずれが予め定められた所定量以下となる状態やユーザーの目視により大きさのずれのないことを確認した状態を含むものである。

【0010】

さらに、本発明のデジタルカメラにおいて、マニュアルフォーカスの操作量を取得する操作量取得手段を備え、前記合成画像生成手段は、前記合成画像として、前記取得された操作量と所定の切出規則とに基づいてマニュアルフォーカスによる焦点が被写体に合うほど該合成画像における重ね合わせ部分の位置のずれが小さくなるよう、前記サブ画像から部分的に画像を切り出す切出位置を設定すると共に該設定した切出位置に従って部分画像を切り出して前記メイン画像の所定位置に重ね合わせた画像を生成する手段であるものとすることもできる。こうすれば、合成画像の重ね合わせ部分の位置のずれを確認することにより被写体に焦点が合っているか否かを確認することができる。この態様の本発明のデジタルカメラにおいて、前記合成画像生成手段は、前記所定の切出規則として、前記メインレンズと前記サブレンズとの間隔と、前記取得された操作量から導かれる被写体までの距離とに基づく三角測量の原理により定められた規則を用いる手段であるものとすることもできる。

【0011】

本発明のデジタルカメラの製造方法は、

マニュアルフォーカスが可能でメインレンズの焦点距離を変更可能なデジタルカメラの製造方法であって、

(a) 画像を表示する画像表示手段と、前記メインレンズを介して得られる被写体の像を光電変換してメイン画像を生成するメイン撮像手段と、サブレンズを介して得られる被写体の像を光電変換してサブ画像を生成するサブ撮像手段と、前記メインレンズの焦点距離を取得する焦点距離取得手段と、前記取得されたメインレンズの焦点距離に基づいて前記メイン画像の被写体の像と前記サブ画像の被写体の像とが略同じ大きさとなるよう画像の倍率を設定する倍率設定手段と、前記設定された倍率で前記メイン画像と前記サブ画像の少なくとも一方の画像の変倍処理を伴って該メイン画像と該サブ画像とを重ね合わせた合

成画像を生成する合成画像生成手段と、該生成された合成画像を表示するよう前記表示手段を制御する表示制御手段と、各種データを記憶する記憶手段とを組み付ける組付工程と

- 、
 - (b) 前記メインレンズの焦点距離を所定の焦点距離に変更する準備工程と、
 - (c) 前記合成画像生成手段に前記合成画像を生成させ、該生成させた合成画像の大きさのずれを確認したときには、該ずれが所定の程度以下となるように前記設定された倍率に対する調整を行なう調整工程と、
 - (d) 前記ずれが所定の程度以下となったときに設定されている倍率に基づいて、前記所定の焦点距離と前記倍率とを関連付けた倍率規則を生成させ、該生成させた倍率規則を前記記憶手段に登録させる登録工程と
- を備えることを要旨とする。

【0012】

この本発明のデジタルカメラの製造方法によれば、各構成部品を組み付け、メインレンズの焦点距離を所定の焦点距離に変更し、合成画像生成手段に合成画像を生成させ、生成させた合成画像の大きさのずれを確認したときには、そのずれが所定の程度以下となるように設定された倍率に対する調整を行ない、ずれが所定の程度以下となったときに設定されている倍率に基づいて、所定の焦点距離と倍率とを関連付けた倍率規則を生成させ、生成させた倍率規則を記憶手段に登録させる。これにより、各構成部品の組付誤差などに起因するデジタルカメラの個体差に伴う倍率のずれを解消した上で倍率規則に登録することができる。

【図面の簡単な説明】

【0013】

- 【図1】 デジタルカメラ10の構成の概略を示す構成図。
- 【図2】 デジタルカメラ10の斜視図。
- 【図3】 デジタルカメラ10の背面図。
- 【図4】 切出規則R_kを生成する方法の考え方を示す説明図。
- 【図5】 サブ画像G_Sにおける切出位置Kの一例を示す説明図。
- 【図6】 倍率規則R_bを生成する方法の考え方を示す説明図。
- 【図7】 ファインダー画像表示処理ルーチンの一例を示すフローチャート。
- 【図8】 ファインダー画像G_Fが生成される様子を示す説明図。
- 【図9】 ファインダー画像G_Fのずれとピント合わせとの関係を示す説明図。
- 【図10】 補正処理ルーチンの一例を示すフローチャート。
- 【図11】 調整中のファインダー画像G_F'の一例を示す説明図。
- 【図12】 デジタルカメラ10の製造工程の一例を示す説明図。

【発明を実施するための形態】

【0014】

次に、本発明の実施の形態を図面に基づいて説明する。図1は本発明の一実施形態であるデジタルカメラ10の構成の概略を示す構成図であり、図2はデジタルカメラ10の斜視図であり、図3はデジタルカメラ10の背面図である。

【0015】

本実施形態のデジタルカメラ10は、本体12と、被写体の像を光電変換しデジタル信号を出力するメイン電子撮像ユニット20と、被写体を光電変換しファインダー画像を生成するためのデジタル信号を出力するサブ電子撮像ユニット40と、メイン電子撮像ユニット20やサブ電子撮像ユニット40から出力される信号を入力して所定の画像処理を施して画像データや画像ファイルを生成する画像処理部70と、画像処理部70から入力した画像データをEVF(Electronic View Finder)82や液晶モニター84に表示させる表示制御部80と、ユーザーによって操作される各種の操作スイッチ群90と、画像処理部70により生成された画像ファイルを保存可能なメモリーカード60と、装置全体を制御するメインコントローラ30とを備える。

【0016】

メイン電子撮像ユニット20は、図示しないレンズマウントを介して本体12に交換可能に取り付けられマニュアルフォーカスレンズとして構成された撮影レンズ21と、撮影レンズ21を介して入力した光を光電変換によって電気信号に変換する周知のCCDイメージセンサーとして構成されたイメージセンサー22と、撮影レンズ機構21とイメージセンサー22との間に配置されたフォーカルプレーンシャッター23と、イメージセンサー22を駆動するドライバー回路24と、イメージセンサー22から出力された電気信号をデジタル信号に変換して出力するアナログフロントエンド(AFE)26とを備える。イメージセンサー22は、数百万～千数百万画素のセンサーとして構成されている。なお、イメージセンサー22としてCCDイメージセンサーを例示したが、CMOS型のイメージセンサーを採用してもよい。

【0017】

撮影レンズ21は、凸レンズと凹レンズとを組み合わせ構成されたレンズ群21aと、光量を調節する絞り機構21bと、ユーザーによる回転操作(ピント合わせ操作)がなされることにより焦点位置が変わる距離リング21cと、撮影レンズ21の取り付け側に設けられ距離リング21cの操作量(回転量)に応じて繰り出し量に変化するよう螺旋状に形成された繰り出し部21dとを備える。なお、この撮影レンズ21の光軸は、本体12の底面と平行になっている。距離リング21cには、図示は省略したが、距離目盛りが外周部分に表示されている。また、繰り出し部21dは、本体12内に前後方向に変位可能に設けられた連動コロ29に当接している。このため、距離リング21cの操作量は、繰り出し部21dの繰り出し量を介して連動コロ29の変位量に変換されることになる。また、デジタルカメラ10には、この連動コロ29の変位量を検出可能なコロ位置センサー29aが取り付けられている。これにより、距離リング21cの操作量は、コロ位置センサー29aの検出値として検出されることになる。即ち、メイン電子撮像ユニット20(撮影レンズ21)のピント位置を反映した値が検出され、以下、この検出値を操作量Soとする。

【0018】

サブ電子撮像ユニット40は、レンズ群41a、41cと絞り機構41bとを有し焦点距離が固定されたパンフォーカス式のサブレンズ41と、サブレンズ41を介して入力した光を光電変換によって電気信号に変換する周知のCCDイメージセンサーとして構成されたイメージセンサー42と、イメージセンサー42を駆動するドライバー回路44と、イメージセンサー42から出力された電気信号をデジタル信号に変換して出力するAFE46とを備える。なお、このサブ電子撮像ユニット40の光軸は、本体12の底面と平行になっている。ここで、サブ電子撮像ユニット40とメイン電子撮像ユニット20との間隔は、本体12の左右(水平)方向に所定間隔A、上下(垂直)方向に所定間隔Bだけ離れた位置となるように組み付けられる。なお、メイン電子撮像ユニット20のイメージセンサー22が数百万～千数百万画素のセンサーとして構成されているのに対し、イメージセンサー42は、例えば200万画素など、数十万～数百万画素のセンサーとして構成されている。

【0019】

画像処理部70は、図示しないが、RGB画素の色補間処理やホワイトバランス処理、色再現処理、リサイズ処理、ガンマ補正処理、画像ファイル生成処理などのデジタルカメラにおける周知の画像処理を実行する各種の画像処理機能ブロックを備える。この画像処理部70は、メイン電子撮像ユニット20から出力されるデジタル信号を入力し画像処理を実行してメイン画像GMを生成したり、生成したメイン画像GMを所定形式の画像に変換し撮影情報を付加して画像ファイルを生成したり、サブ電子撮像ユニット40から出力されるデジタル信号を入力し画像処理を実行してサブ画像GSを生成したりする。また、画像処理部70は、画像から部分的に画像を切り出す切出処理を実行する切出処理部と、切り出した部分画像を含めて画像のサイズを調整するサイズ調整部と、一方の画像に他方の画像を重ね合わせる合成処理を実行する合成処理部とを備えており、サブ画像GSから部分的に切り出した部分画像GSpをメイン画像GMに重ね合わせる合成処理を行なうこ

とによりEVF82に表示するためのファインダー画像GFを生成する。なお、画像処理部70の合成処理部は、下層の画像に対して上層に重ね合わせる画像の透明度を示す係数 α を用いて下層の画像の画素値と上層の画像の画素値と混合して合成画像の画素値を生成する、いわゆる α ブレンド処理が可能となっている。

【0020】

表示制御部80は、画像処理部70で生成されたファインダー画像GFをEVF82に表示したり、画像処理部70で生成されたメイン画像GMやメモリーカード60に保存された画像ファイル内の画像を液晶モニター84に表示したりする。なお、表示制御部80は、ファインダー画像GFの特定の部分を拡大してEVF82に表示する拡大表示処理が可能となっている。

【0021】

操作スイッチ群90は、シャッターボタン90aやダイヤルスイッチ(SW)90b、巻上レバー90c、モード選択ボタン90d、OKボタン90e、キャンセルボタン90f、JOGダイヤル90g、焦点選択レバー90hなどからなる。シャッターボタン90aは、撮影レンズ21を通じてイメージセンサー22上に結像された画像を取り込む指示をユーザーから受け付けるためのボタンである。ダイヤルスイッチ90bは、ユーザーによるシャッタースピードや露出値などの撮影に関する各種設定値を設定するためのスイッチである。巻上レバー90cは、巻上操作に伴って、フォーカルプレーンシャッター23の図示しないシャッター幕をシャッターの切られた状態から再度次回のシャッター動作が可能な状態に引き上げて機械的に固定するためのボタンである。モード選択ボタン90dは、各種モードを選択するためのボタンである。ここで、選択可能なモードとしては、液晶モニター84の明るさの設定などの各種設定を行なう設定用モードやファインダー画像GFの生成に用いられる後述する倍率規則Rbを補正するための補正用モードなどがある。OKボタン90eは、各種選択を決定するためのボタンであり、キャンセルボタン90fは、一旦行なった選択を解除するためのボタンである。JOGダイヤル90gは、回転操作に伴って、液晶モニター84に表示される各種項目を選択するためのカーソルを移動させたり、各種設定値の数値を変更したりする。また、このJOGダイヤル90gは、上方に引き上げられた状態と下方に押し下げられた状態のいずれかの状態にあり、例えば、上方に引き上げられた状態で回されると液晶モニター84に表示される画像を上下にスクロールさせるためのダイヤルとして機能し、下方に押し下げられた状態で回されると左右にスクロールさせるためのダイヤルとして機能する。焦点選択レバー90hは、取り付けられている撮影レンズ21の焦点距離fを選択するためのレバーである。図2に示すように、焦点選択レバー90hは、3つの焦点距離f1、f2、f3のうちいずれかを選択可能となっており、撮影レンズ21を交換したときにユーザーによって該当する焦点距離fの位置に操作される。

【0022】

メインコントローラ30は、CPU32を中心とするマイクロプロセッサとして構成されており、処理プログラムや各種テーブルを記憶するROM34と、データを一時的に記憶するRAM36と、データを書き換え可能で電源を切ってもデータを保持するフラッシュメモリー38と、図示しない入出力ポートおよび通信ポートとを備える。フラッシュメモリー38には、ファインダー画像GFの生成に用いられる切出規則Rkや倍率規則Rbが登録されている。メインコントローラ30には、操作スイッチ群90からの各種の操作信号やコロ位置センサー29からの操作量So、メモリーカード60から読み出した画像ファイル、画像処理部70からの各種画像などが入力される。また、メインコントローラ30からは、フォーカルプレーンシャッター23へのシャッター駆動信号やドライバ回路24、44への制御信号、メモリーカード60へ書き込む画像ファイル、画像処理部70への画像処理指令、表示制御部80への表示制御指令などが出力される。

【0023】

ここで、切出規則Rkと倍率規則Rbについて説明する。まず、切出規則Rkについて説明する。この切出規則Rkは、ファインダー画像GFを生成するためにピント合わせ操

作に応じてサブ画像GSから部分画像を切り出す切出位置Kを設定するための規則である。図4は、切出規則Rkを生成する方法の考え方を示す説明図であり、図5は、サブ画像GSにおける切出位置Kの一例を示す説明図である。図4では、メイン電子撮像ユニット20とサブ電子撮像ユニット40とを上面から見た位置関係を示しており両撮像ユニットの間隔は上述したように所定間隔Aである。また、図4に点線で示す領域は、サブ電子撮像ユニット40の撮像領域のイメージを示す。図4に示すように、メイン電子撮像ユニット20の光軸上の距離L1の位置にある被写体（図4中に黒丸で図示、以下同様）は、サブ電子撮像ユニット40の光軸から角度 θ 1をなす撮像領域上の位置（白丸）に撮像される。同様に、距離L2の被写体（黒三角）は角度 θ 2をなす位置（白三角）に、距離L3の被写体（黒四角）は角度 θ 3をなす位置（白四角）にそれぞれ撮像される。このような角度 θ と距離Lと所定間隔Aとは、三角測量の原理により式（1）のような関係にあり、所定間隔Aは既知の定数であるため距離Lが決まれば角度 θ を求めることができる。なお、側面から見た位置関係の図示は省略したが、両撮像ユニットの上下方向の間隔は上述したように所定間隔Bであるから、角度 θ の代わりに角度 φ を用いると、式（1）と同様に式（2）のような関係にある。また、図5に示すように、サブ画像GS（撮像領域）の中心を原点として図5中左右方向をX軸、上下方向をY軸とするXY座標系を設定すると、サブ画像GSの中の被写体画像の位置は、デジタルカメラ10から被写体までの距離が短くなるほど原点から遠ざかり、距離が遠くなるほど原点に近くなり無限遠の距離では原点に一致する。なお、図5では、図4に示した撮像領域の左右方向と方向を合わせるために、便宜上、本来の画像から左右を反転させたサブ画像GSを図示するものとした。これらのことから、メイン画像GMの中央部に映し出された距離L1の位置にある被写体画像は、サブ画像GSにおいては、距離L1に対応する位置K1（X1，Y1）を中心として映し出されることになる。ここで、被写体までの距離に応じて変化する距離リング21cの操作量をコロ位置センサー29aによって操作量Soとして検出しているため、操作量Soに基づいて距離Lを導くことができる。このため、操作量Soから距離Lを導いて、導いた距離Lと式（1）（2）とから角度 θ ，角度 φ を求めることができる。そして、角度 θ とX座標との関係および角度 φ とY座標との関係を予め設定しておけば、角度 θ に対応するX座標の値と角度 φ に対応するY座標の値即ち切出位置Kを導出することができる。本実施形態では、このような操作量Soと切出位置Kとの対応関係を切出規則Rkとして記憶しているものとした。この切出規則Rkは、操作量Soと切出位置Kとの関係式として記憶し、切出位置Kを求める場合に、その関係式を用いて操作量Soから演算を行なって切出位置Kを求めるものとした。なお、角度 θ ， φ の最大値はサブレンズ41の画角により定まり、それに対応するX，Y座標の値から、角度 θ とX座標との関係および角度 φ とY座標との関係を設定することができる。

【0024】

$$\tan \theta = A/L \quad \cdots (1)$$

$$\tan \varphi = B/L \quad \cdots (2)$$

【0025】

次に、倍率規則Rbについて説明する。この倍率規則Rbは、サブ画像GSとメイン画像GMとに映し出される被写体を同じ大きさとするための、サブ画像GSに対する倍率を設定するための規則である。図6は、倍率規則Rbを生成する方法の考え方を示す説明図である。図6（a）～（c）はメイン画像GMを示し、図6（d）はサブ画像GSを示す。なお、図6（d）においても、図5と同様にサブ画像GSの左右を反転させて図示するものとした。ここで、メイン電子撮像ユニット20とサブ電子撮像ユニット40とは、上述したように画素数の異なるイメージセンサー22とイメージセンサー42とが用いられているため、図示するように、メイン画像GMとサブ画像GSのサイズが異なるものとなる。また、メイン電子撮像ユニット20は、焦点距離fの異なるレンズ21を交換可能なものであり、焦点距離fが異なるとその画角も変わるため、図6（a）～（c）に示すように、各焦点距離f1，f2，f3に応じてメイン画像GMに映し出される被写体の大きさも変化することになる。このような、メイン画像GMとサブ画像GSとのサイズの違い

や撮影レンズ21の各焦点距離 f_1 , f_2 , f_3 とサブレンズ41の焦点距離との関係に基づいて、サブ画像GSに被写体像とメイン画像GMの被写体像との大きさを揃えるための調整倍率Bを倍率 B_1 , B_2 , B_3 としてそれぞれ設定し、各焦点距離 f_1 , f_2 , f_3 と関連付けた倍率規則Rbを生成するものとした。

【0026】

次に、こうして構成された本実施形態のデジタルカメラ10の動作について説明する。図7は、メインコントローラ30により実行されるファインダー画像表示処理ルーチンの一例を示すフローチャートである。このルーチンは、図示しない電源ボタンがオンにされ、撮影モードを開始してからオフされるまで実行される。なお、画像処理や表示制御などは、実際には画像処理部70や表示制御部80が主体となって行なわれるものであるが、以下の説明では特に主体を区別することなく説明する。このルーチンが実行されると、メインコントローラ30は、まず、メイン電子撮像ユニット20のイメージセンサー22を駆動してデジタル信号の読み出しを行なうと共に（ステップS100）、サブ電子撮像ユニット40のイメージセンサー42を駆動してデジタル信号の読み出しを行なう（ステップS110）。次に、読み出しを行なったデジタル信号に対して各種の画像処理を実行してメイン画像GMとサブ画像GSとを生成する（ステップS120）。メイン画像GMとサブ画像GSとを生成すると、現在取り付けられている撮影レンズ21の焦点距離 f を入力する（ステップS130）。ここでは、焦点選択レバー90hにより焦点距離 $f_1 \sim f_3$ のうちのいずれかに選択されているものを入力する。そして、入力した焦点距離 f を用いて倍率規則Rbを参照して調整倍率Bを設定する（ステップS140）。次に、コロ位置センサー29aからの距離リング21cの操作量Soを入力し（ステップS150）、入力した操作量Soを用いて切出規則Rkを参照して切出位置Kを設定する（ステップS160）。

【0027】

こうして、調整倍率Bと切出位置Kとを設定すると、サブ画像GSの切出位置Kに基づいた位置で調整倍率Bに基づいた大きさの切出領域から部分画像GSpを切り出し（ステップS170）、切り出した部分画像GSpに対し調整倍率Bに従ったサイズ調整を行なう（ステップS180）。調整倍率Bは、焦点距離 f を用いて倍率規則Rbを参照して設定されたものであるため、サイズ調整された部分画像GSpは、そこに映し出されている被写体の大きさがメイン画像GMの被写体と同じ大きさとなる。こうしてサイズ調整が行なわれた部分画像GSpをメイン画像GMの中央に重ね合わせてファインダー画像GFを生成する（ステップS190）。ファインダー画像GFの生成は、下層のメイン画像GMに対する上層のサブ画像GSの透明度を示す係数 α に基づいて、部分画像GSpの画素値sとメイン画像GMの画素値mとを混合するアルファブレンド処理により、重ね合わせ部分の画素値を生成することにより行なう。なお、重ね合わせ部分を除く部分は、メイン画像GMの画素値mを用いる。図8は、ファインダー画像GFが生成される様子を示す説明図である。図示するように、ファインダー画像GFの重ね合わせ部分はアルファブレンド処理により二重像として生成される。なお、重ね合わせ部分では、サブ画像GSから切り出された部分画像GSpを実線で示し、メイン画像GMを点線で示す。

【0028】

こうしてファインダー画像GFを生成すると、生成したファインダー画像GFをEVF82に表示して（ステップS200）、ステップS100に戻り処理を繰り返す。このように、撮影レンズ21の焦点距離 f を用いて倍率規則Rbを参照して調整倍率Bを設定すると共にメイン電子撮像ユニット20のピント位置を反映するコロ位置センサー29aからの操作量Soを用いて切出規則Rkを参照して切出位置Kを設定し、設定した切出位置Kから切り出された部分画像GSpを調整倍率Bに従ってサイズ調整してからメイン画像GMに重ね合わせたファインダー画像GFを表示することができる。このため、メイン電子撮像ユニット20のピント合わせ操作に応じて重ね合わせ部分の二重像が変化するファインダー画像GFを生成することができる。図9は、ファインダー画像GFのずれとピント合わせとの関係を示す説明図である。図9（b）では、重ね合わせ部分にずれが生じて

いないが、これはサブ画像GS中の被写体画像から正しい位置の部分画像GS_pを切り出していることを意味し、被写体にピントが合致している。一方、図9(a), (c)では重ね合わせ部分にずれが生じており、これはサブ画像GS中の被写体画像からずれた位置の部分画像GS_pを切り出していることを意味し、被写体とピントがずれている。なお、図9(a)では、被写体よりも奥側にピントがずれており、図9(c)では被写体よりも手前側にピントがずれている。このように、ユーザーは、ファインダー画像GFの重ね合わせ部分のずれを確認しながら、ピント合わせをすることができる。ここで、ファインダー画像GFは、主にメイン画像GMを用いて部分画像GS_pを重ね合わせたものであるから、メイン画像GMと視差のない画像とすることができる。また、現在取り付けられている撮影レンズ21の焦点距離fを用いて部分画像GS_pのサイズを調整した上でメイン画像GMに重ね合わせるから、重ね合わせ部分の画像に大きさのずれが生じることはない。

【0029】

次に、ユーザーにより倍率規則R_bが補正される際のデジタルカメラ10の動作について説明する。図10は、メインコントローラ30により実行される補正処理ルーチンの一例を示す説明図である。この処理は、ユーザーのモード選択ボタン90dの操作により補正用モードとされたときに実行される。なお、ここでは、切出位置Kが正常であることを前提に調整倍率Bに対する補正について説明する。この補正処理ルーチンが実行されると、メインコントローラ30は、まず、基準距離Lの位置に目標物Mを置いて、距離リング21cの距離目盛りが距離Lを示す回転位置となるよう操作する作業を行ない、作業が完了すればOKボタン90eを操作することを促す旨の指示画面を液晶モニター84に表示して(ステップS300)、ユーザーによりOKボタン90eが操作されるのを待つ(ステップS310)。OKボタン90eが操作されると、現在取り付けられている撮影レンズ21の焦点距離fを入力する(ステップS320)。上述したように、焦点選択レバー90hにより選択されているものを入力する。こうして焦点距離fを入力すると、現在の調整倍率Bと切出位置Kとに従ってファインダー画像GFを生成する(ステップS340)。この処理は、上述したファインダー画像表示処理ルーチンの処理と同様に行なわれる。なお、このときの調整倍率Bは、入力した焦点距離fを用いて倍率規則R_bを参照して設定された倍率となっている。そして、生成されたファインダー画像GFの重ね合わせ部分を拡大したファインダー画像GF'をEVF82に表示する(ステップS350)。図11は、補正用モードでのファインダー画像GF'の一例を示す説明図である。図示するように、重ね合わせ部分が拡大して表示されると共に調整中であることを示すメッセージが表示される。ここで、本来であれば、図11(b)に示すように、重ね合わせ部分に大きさのずれのないファインダー画像GF'が表示される。しかし、何らかの異常によりメイン電子撮像ユニット20やサブ電子撮像ユニット40の位置が前後にずれってしまった場合などには、図11(a)に示すように、重ね合わせ部分に大きさのずれが生じることもある。

【0030】

こうしてファインダー画像GF'を表示すると、JOGダイヤル90gによる調整操作(ステップS360)やOKボタン90eの操作(ステップS370)がなされるのを待つ。調整操作がなされたときには、拡大操作か縮小操作かを判定する(ステップS380)。例えば、JOGダイヤル90gが右に回されたときには拡大と判定し、左にまわされたときには縮小と判定する。拡大操作と判定したときにはJOGダイヤル90gの操作量に応じた正の値の倍率変更量Δbを設定し(ステップS390)、縮小操作と判定したときにはJOGダイヤル90gの操作量に応じた負の値の倍率変更量Δbを設定して(ステップS400)、現在の調整倍率Bに倍率変更量Δbを加えて調整倍率Bを変更する(ステップS410)。

【0031】

こうして調整倍率Bを変更すると、ステップS340に戻り処理を繰り返し、ファインダー画像GF'において大きさのずれが確認されなくなるまでユーザーからの調整操作を繰り返し受け付ける。そして、ステップS370でOKボタン90eが操作されたと判定

したときには、現在の調整倍率 B で倍率規則 R_b を補正するか否かを問い合わせる確認メッセージをEVF82に表示して（ステップS430）、ボタン操作がなされるのを待つ（ステップS440）。ステップS440でキャンセルボタン90fが操作されると、再びステップS340に戻り処理を繰り返す。一方、ステップS440でOKボタン90eが操作されると、倍率変更量 ΔB （倍率変更量 Δb の累積値）を入力された焦点距離 f における補正量として用いて倍率規則 R_k を補正して（ステップS450）、本ルーチンを終了する。倍率規則 R_k の補正として、例えば、入力された焦点距離 f が焦点距離 f_2 の場合を考える。この場合、まず、焦点距離 f_2 の調整倍率 B_2 に対して倍率変更量 ΔB が補正量として加算される。また、焦点距離 f_1 の調整倍率 B_1 に対しては、倍率変更量 ΔB を調整倍率 B_2 と調整倍率 B_1 との比に応じた量を補正量として加算する。なお、焦点距離 f_3 の調整倍率 B_3 に対しても同様である。これにより、簡易な方法でユーザーによる倍率規則 R_b の補正を可能とすることができる。なお、複数の焦点距離のそれぞれについて倍率変更量 ΔB を取得して、それらに基づいて倍率規則 R_k を補正してもよい。

【0032】

ここで、デジタルカメラ10の出荷時の倍率規則 R_b は、デジタルカメラ10の製造工程において、デジタルカメラ10の個体差を反映した上で登録されている。以下、デジタルカメラ10の製造方法と合わせて説明する。図12は、デジタルカメラ10の製造工程の一例を示す説明図である。デジタルカメラ10の製造工程としては、まず、各構成部品を本体12に組み付ける（工程S500）。この組付工程では、メイン電子撮像ユニット20やサブ電子撮像ユニット40、画像処理部70、表示制御部80、EVF82、液晶モニター84、操作スイッチ群90、メインコントローラ30などが本体12に組み付けられる。このときフラッシュメモリー38には、倍率規則 R_b として各焦点距離におけるデフォルトの調整倍率が登録され、また、切出規則 R_k としては既に生成されたものが登録されている。こうしてデジタルカメラ10を組み付けると、倍率規則 R_b を生成するための準備を行なう（工程S510）。この準備工程では、デジタルカメラ10の図示しない電源ボタンをオンとして三脚などに固定し、固定されたデジタルカメラ10から所定距離 L だけ離れた位置に目標物 M を置き、焦点選択レバー90hを操作して現在取り付けられている撮影レンズ21の焦点距離 f （ここでは、焦点距離 f_1 とする）に合わせておき、距離リング21cに記された距離目盛りが距離 L を示す回転位置となるよう回転操作する。また、このとき、デジタルカメラ10では、電源ボタンがオンされたことにより、上述したファインダー画像表示処理ルーチンが実行される。このため、切出位置 k と焦点距離 f_1 に対応するデフォルトの調整倍率とに従って生成されたファインダー画像GFがEVF82に表示される。

【0033】

こうしてファインダー画像GFが表示されると、表示されたファインダー画像GFの重ね合わせ部分の大きさのずれを確認する（工程S520）。このとき、デジタルカメラ10の個体差に伴って、重ね合わせ部分に若干のずれが生じることがある。なお、デジタルカメラ10の個体差は、メイン電子撮像ユニット20やサブ電子撮像ユニット40などの各部品の製造誤差や組付誤差、イメージセンサー22、42の特性などに起因して生じるものである。そして、確認工程において大きさのずれを確認したときには、そのずれが確認できなくなるまで倍率調整を行なう（工程S530）。この倍率調整は、図10の補正処理ルーチンの調整処理と同様に行なわれる。大きさのずれが確認できなくなったときには、焦点距離 f_1 における調整量として用いて倍率規則 R_b を生成してフラッシュメモリー38に登録する（工程S540）。倍率規則 R_b の生成は、図10の補正処理ルーチンにおける倍率規則 R_b の補正と同様に、焦点距離 f_1 における調整量を各焦点距離における調整倍率との比に応じて加算することなどにより行なわれる。これにより、デジタルカメラ10の組付誤差などに起因して生じる個体差に伴う大きさのずれを排除して、精度の高い倍率規則 R_b を生成して登録することができる。

【0034】

ここで、本実施形態の構成要素と本発明の構成要素との対応関係を明らかにする。本実

施形態のE V F 8 2が本発明の「画像表示手段」に相当し、メイン電子撮像ユニット2 0が「メイン撮像手段」に相当し、サブ電子撮像ユニット4 0が「サブ撮像手段」に相当し、焦点選択レバー9 0 hが「焦点距離取得手段」に相当し、メインコントローラー3 0が「倍率設定手段」に相当し、メインコントローラー3 0と画像処理部7 0とが「合成画像生成手段」に相当し、表示制御部8 0が「表示制御手段」に相当する。また、J O Gダイヤル9 0 gが「指示受付手段」に相当し、メインコントローラー3 0が「補正手段」に相当する。

【0035】

以上詳述した本実施形態のデジタルカメラ1 0によれば、現在取り付けられている撮影レンズ2 1の焦点距離 f を取得し、取得された焦点距離 f を用いて倍率規則R bを参照して調整倍率Bを設定し、サブ画像G Sの所定位置から切り出された部分画像G S pを設定された調整倍率Bに従ってサイズ調整してメイン画像GMと同じ大きさとしてから、メイン画像GMに重ね合わせてファインダー画像G Fを生成し、生成したファインダー画像G FをE V F 8 2に表示するから、複雑な機構を採用することなく、簡易な仕組みで2つの画像を重ね合わせたファインダー画像を生成することができる。

【0036】

また、補正用モードにおいてユーザーによる操作によって設定された倍率変更量に応じて倍率規則R bを補正するものとしたから、ユーザーによる倍率規則R bの補正を可能とすることができる。また、補正用モードでのファインダー画像G F'は、重ね合わせ部分を拡大表示するものとしたから、大きさのずれの確認を容易なものとしてスムーズに倍率規則R bの補正をすることができる。さらに、マニュアルフォーカスの操作量S oを取得し切出規則R kを参照して部分画像G S pの切出位置Kを設定するから、重ね合わせ部分の位置ずれを確認することにより、ピントが合っているか否かを確認することができる。

【0037】

なお、本発明は上述した実施態様に何ら限定されることはなく、本発明の技術的範囲に属する限り種々の態様で実施し得ることはいうまでもない。

【0038】

上述した実施形態では、ファインダー画像G FをE V F 8 2に表示するものとしたが、これに限られず、画像表示モニター8 4に表示するものとしてもよい。

【0039】

上述した実施形態では、1つの焦点距離に対する補正量を各焦点距離に反映させるものとしたが、これに限られず、各焦点距離毎に調整倍率Bの調整を行なった結果をそれぞれに反映させるものとしてもよい。

【0040】

上述した実施形態では、サブ画像G Sから部分画像G S pを切り出して部分画像G s pに対してサイズ調整を行なうものとしたが、これに限られず、先にサブ画像G Sにサイズ調整を行なってから部分画像G S pを切り出すものとしてもよい。また、サイズ調整をサブ画像G Sに行なうものに限られず、メイン画像GMに対して行なうものとしてもよい。

【0041】

上述した実施形態では、サブ画像G Sがメイン画像GMよりもサイズが小さい場合を示したが、これに限られず、サブ画像G Sとメイン画像GMとが同じサイズであってもよいし、サブ画像G Sがメイン画像GMよりもサイズが大きくてもよい。なお、サブ画像G Sから切り出した部分画像G S pをメイン画像GMに合成するものとしたが、サブ画像G Sをそのまま合成するものとしてもよい。

【0042】

上述した実施形態では、焦点選択レバー9 0 hにより撮影レンズ2 1の焦点距離 f が3つの焦点距離 $f_1 \sim f_3$ から選択されるものとしたが、これに限られず、4つ以上の焦点距離から選択されるものとしてもよい。あるいは、ユーザーが焦点距離の数値を入力するものとしてもよいし、撮影レンズ2 1から電気的な通信手段などを用いてユーザーを介さずに焦点距離を取得してもよい。また、撮影レンズ2 1がズームレンズであってもよく、

ズームレンズを取り付けた場合には、その時点の焦点距離を電氣的な通信手段などにより取り込んで、調整倍率Bを設定することが望ましい。ズームレンズを取り付けた場合には、倍率規則R bを連続で変化させるべきであり、倍率規則R bを関係式として記憶し、倍率を求める場合には、その関係式を用いて演算を行なって調整倍率Bを求めることが望ましい。

【0043】

上述した実施形態では、距離リング21 cの回転量を連動コロ29を介して検出するものとしたが、距離リング21 cの回転角を直接検出することにより回転量を検出するものとしてもよい。

【0044】

上述した実施形態では、倍率規則R bを焦点距離fと倍率とを対応付けた規則としたが、焦点距離fとコロ位置センサー29 aから取得する被写体までの距離と倍率とを対応付けた規則としてもよい。これにより、メイン画像GMに写し出される被写体の大きさが被写体までの距離に依存している場合でも、部分画像GS pに写る被写体画像とメイン画像GMに写る被写体画像との大きさを揃えることができる。

【0045】

上述した実施形態では、部分画像GS pをメイン画像GMに α ブレンド処理を用いてそのまま重ね合わせることでファインダー画像GFを生成するものとしたが、部分画像GS p、メイン画像GMの少なくとも一方の色を変化させた上で α ブレンド処理を用いて重ね合わせることでファインダー画像GFを生成するものとしてもよい。この場合、メイン画像GMの重ね合わせ部分の画像や部分画像GS pをモノクロ化したりアンバー色を着色したりするものなどとするればよい。これにより、メイン画像GMの重ね合わせ部分の画像と部分画像GS pとの区別を容易にすることができる。

【0046】

上述した実施形態では、メイン電子撮像ユニット20やサブ電子撮像ユニット40における光軸回りの回転を考慮することなく切出位置Kや切出領域を定めるものとしたが、メイン電子撮像ユニット20やサブ電子撮像ユニット40における光軸回りの回転を反映した切出位置Kや切出領域として、被写体にピントが合致している場合に、重ね合わせ部分の回転方向のずれが生じないようにしてもよい。この場合、切出規則R kには回転に対応した情報を含めることが望ましい。

【0047】

上述した実施形態では、倍率規則R bの生成時や補正時における調整を作業者やユーザーによるJOGダイヤル90 gの手動操作に基づいて行なうものとしたが、これに限られず、自動で行なうものとしてもよい。

【符号の説明】

【0048】

10 デジタルカメラ、12 本体、20 メイン電子撮像ユニット、21 撮影レンズ、21 a レンズ群、21 b 絞り機構、21 c 距離リング、21 d 繰り出し部、22 イメージセンサー、23 フォーカルプレーンシャッター、24 ドライバー回路、26 アナログフロントエンド(AFE)、29 連動コロ、29 a コロ位置センサー、30 メインコントローラー、32 CPU、34 ROM、36 RAM、38 フラッシュメモリー、40 サブ電子撮像ユニット、41 サブレンズ、41 a、41 c レンズ群、41 b 絞り機構、42 イメージセンサー、44 ドライバー回路、46 アナログフロントエンド(AFE)、60 メモリーカード、70 画像処理部、80 表示制御部、82 EVF、84 液晶モニター、90 操作スイッチ群、90 a シャッターボタン、90 b ダイヤルスイッチ(ダイヤルSW)、90 c 巻上レバー、90 d モード選択ボタン、90 e OKボタン、90 f キャンセルボタン、90 g JOGダイヤル、90 h 焦点選択レバー、GF、GF' ファインダー画像、GM メイン画像、GS サブ画像、GS p 部分画像、M 目標物、A、B 所定間隔。

【書類名】 特許請求の範囲

【請求項 1】

マニュアルフォーカスが可能でメインレンズの焦点距離を変更可能なデジタルカメラであって、

画像を表示する画像表示手段と、

前記メインレンズを介して得られる被写体の像を光電変換してメイン画像を生成するメイン撮像手段と、

サブレンズを介して得られる被写体の像を光電変換してサブ画像を生成するサブ撮像手段と、

前記メインレンズの焦点距離を取得する焦点距離取得手段と、

前記取得されたメインレンズの焦点距離に基づいて、画像の倍率を設定する倍率設定手段と、

前記設定された倍率で前記メイン画像と前記サブ画像の少なくとも一方の画像の変倍処理を伴って、該メイン画像と該サブ画像とを重ね合わせた合成画像を生成する合成画像生成手段と、

該生成された合成画像を表示するよう前記表示手段を制御する表示制御手段と

を備えるデジタルカメラ。

【請求項 2】

前記倍率設定手段は、前記メイン画像の被写体の像と前記サブ画像の被写体の像とが略同じ大きさとなるよう倍率を設定する手段である請求項 1 記載のデジタルカメラ。

【請求項 3】

前記サブレンズとしてパンフォーカスレンズが取り付けられてなる請求項 2 記載のデジタルカメラ。

【請求項 4】

前記メインレンズの焦点距離を所定の焦点距離とした際の前記合成画像における大きさのずれの確認を伴って画像の倍率を設定するための所定の倍率規則の補正が可能な補正用モードを有する請求項 3 記載のデジタルカメラであって、

前記補正用モードにおいて、前記合成画像における大きさのずれが所定の程度以下となるよう前記設定された倍率に対する変更の指示を受け付ける指示受付手段と、

前記補正用モードにおいて、前記受け付けられた倍率の変更量を前記所定の焦点距離における補正量として用いて前記倍率規則を補正する補正手段と

を備えるデジタルカメラ。

【請求項 5】

請求項 1 ないし 4 いずれか 1 項に記載のデジタルカメラであって、

マニュアルフォーカスの操作量を取得する操作量取得手段を備え、

前記合成画像生成手段は、前記合成画像として、前記取得された操作量と所定の切出規則とに基づいてマニュアルフォーカスによる焦点が被写体に合うほど該合成画像における重ね合わせ部分の位置のずれが小さくなるよう、前記サブ画像から部分的に画像を切り出す切出位置を設定すると共に該設定した切出位置に従って部分画像を切り出して前記メイン画像の所定位置に重ね合わせた画像を生成する手段である

デジタルカメラ。

【請求項 6】

前記合成画像生成手段は、前記所定の切出規則として、前記メインレンズと前記サブレンズとの間隔と、前記取得された操作量から導かれる被写体までの距離とに基づく三角測量の原理により定められた規則を用いる手段である請求項 5 記載のデジタルカメラ。

【請求項 7】

マニュアルフォーカスが可能でメインレンズの焦点距離を変更可能なデジタルカメラの製造方法であって、

(a) 画像を表示する画像表示手段と、前記メインレンズを介して得られる被写体の像を光電変換してメイン画像を生成するメイン撮像手段と、サブレンズを介して得られる被写

体の像を光電変換してサブ画像を生成するサブ撮像手段と、前記メインレンズの焦点距離を取得する焦点距離取得手段と、前記取得されたメインレンズの焦点距離に基づいて前記メイン画像の被写体の像と前記サブ画像の被写体の像とが略同じ大きさとなるよう画像の倍率を設定する倍率設定手段と、前記設定された倍率で前記メイン画像と前記サブ画像の少なくとも一方の画像の変倍処理を伴って該メイン画像と該サブ画像とを重ね合わせた合成画像を生成する合成画像生成手段と、該生成された合成画像を表示するよう前記表示手段を制御する表示制御手段と、各種データを記憶する記憶手段とを組み付ける組付工程と

、
（b）前記メインレンズの焦点距離を所定の焦点距離に変更する準備工程と、

（c）前記合成画像生成手段に前記合成画像を生成させ、該生成させた合成画像の大きさのずれを確認したときには、該ずれが所定の程度以下となるように前記設定された倍率に対する調整を行なう調整工程と、

（d）前記ずれが所定の程度以下となったときに設定されている倍率に基づいて、前記所定の焦点距離と前記倍率とを関連付けた倍率規則を生成させ、該生成させた倍率規則を前記記憶手段に登録させる登録工程と

を備えるデジタルカメラの製造方法。

【書類名】 要約書

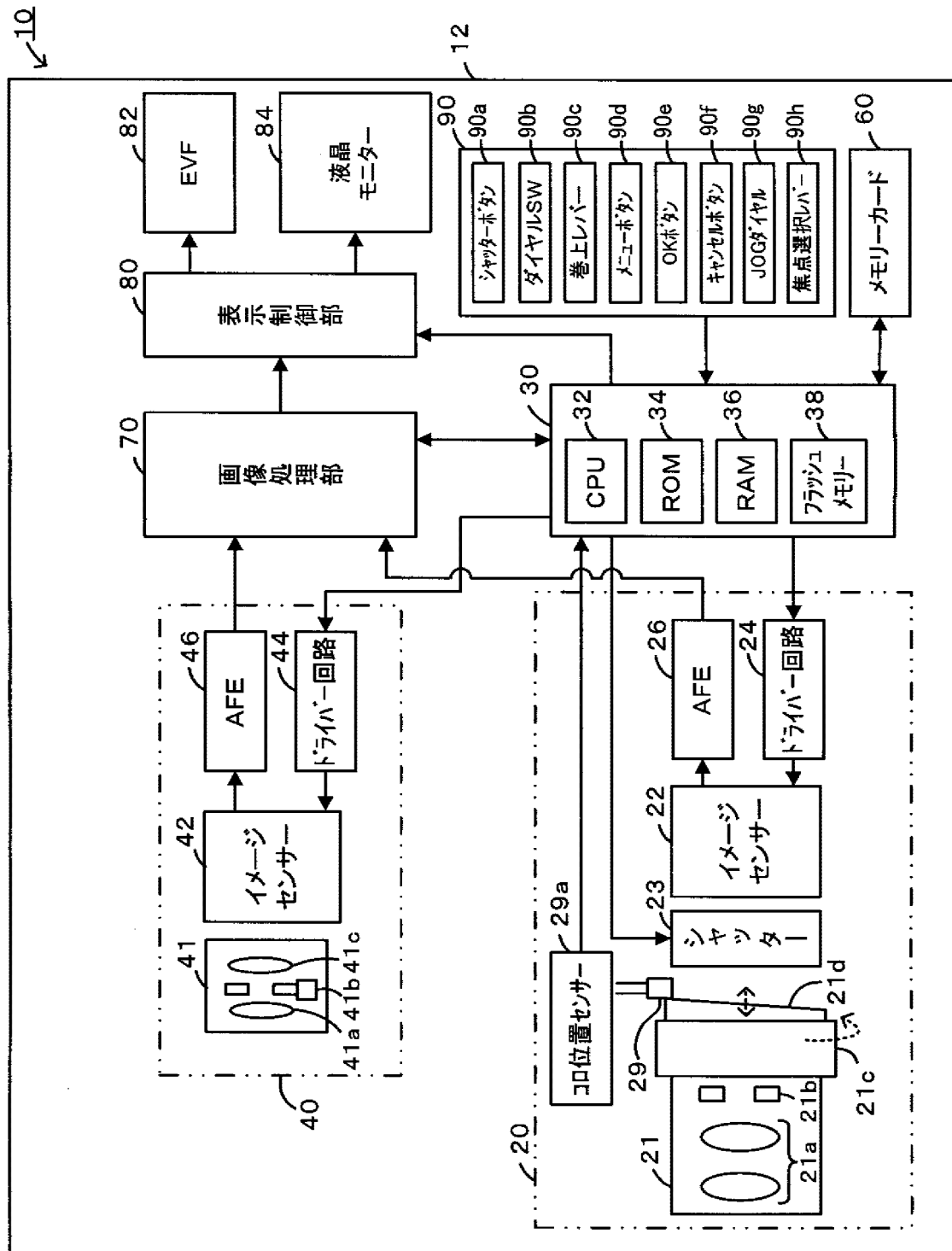
【要約】

【課題】 簡易な仕組みで2つの画像を重ね合わせた合成画像を生成する。

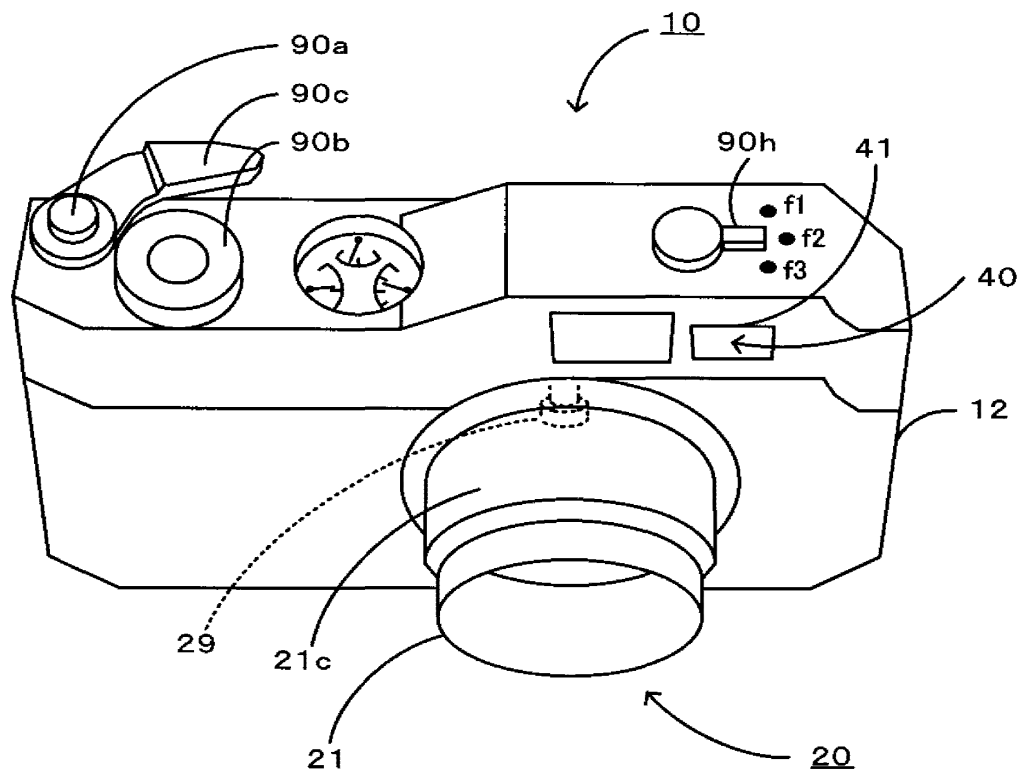
【解決手段】 メインレンズの焦点距離を取得し、取得されたメインレンズの焦点距離とサブレンズの焦点距離とに基づいてサブ画像G Sの所定位置Kから切り出される部分画像G S pとメイン画像GMとが同じ大きさとなるよう調整倍率を設定し、設定された調整倍率を用いて部分画像G S pのサイズの調整を伴って部分画像G S pをメイン画像GMの中央に重ね合わせたファインダー画像G Fを生成し、生成されたファインダー画像G Fを表示する。これにより、複雑な機構を採用することなく、簡易な仕組みで2つの画像を重ね合わせたファインダー画像G Fを生成することができる。

【選択図】 図7

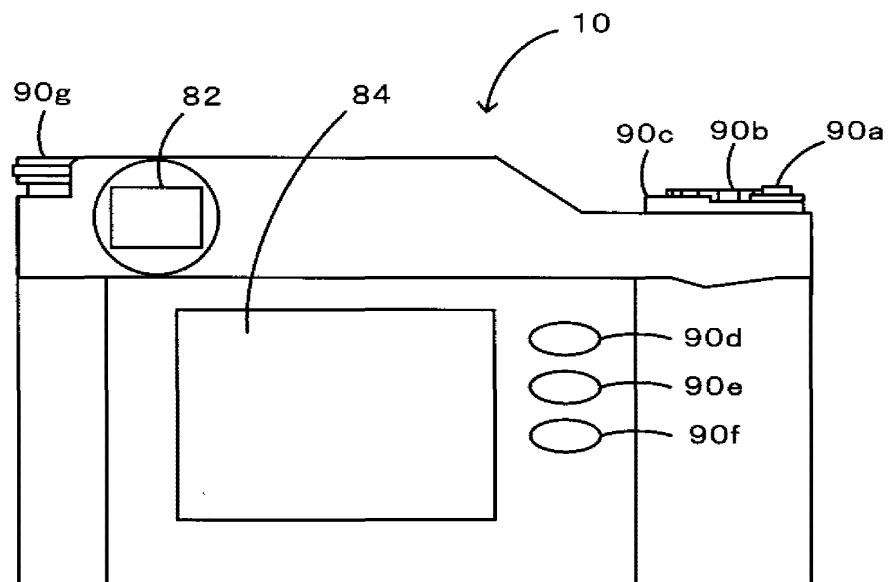
【書類名】 図面
【図 1】



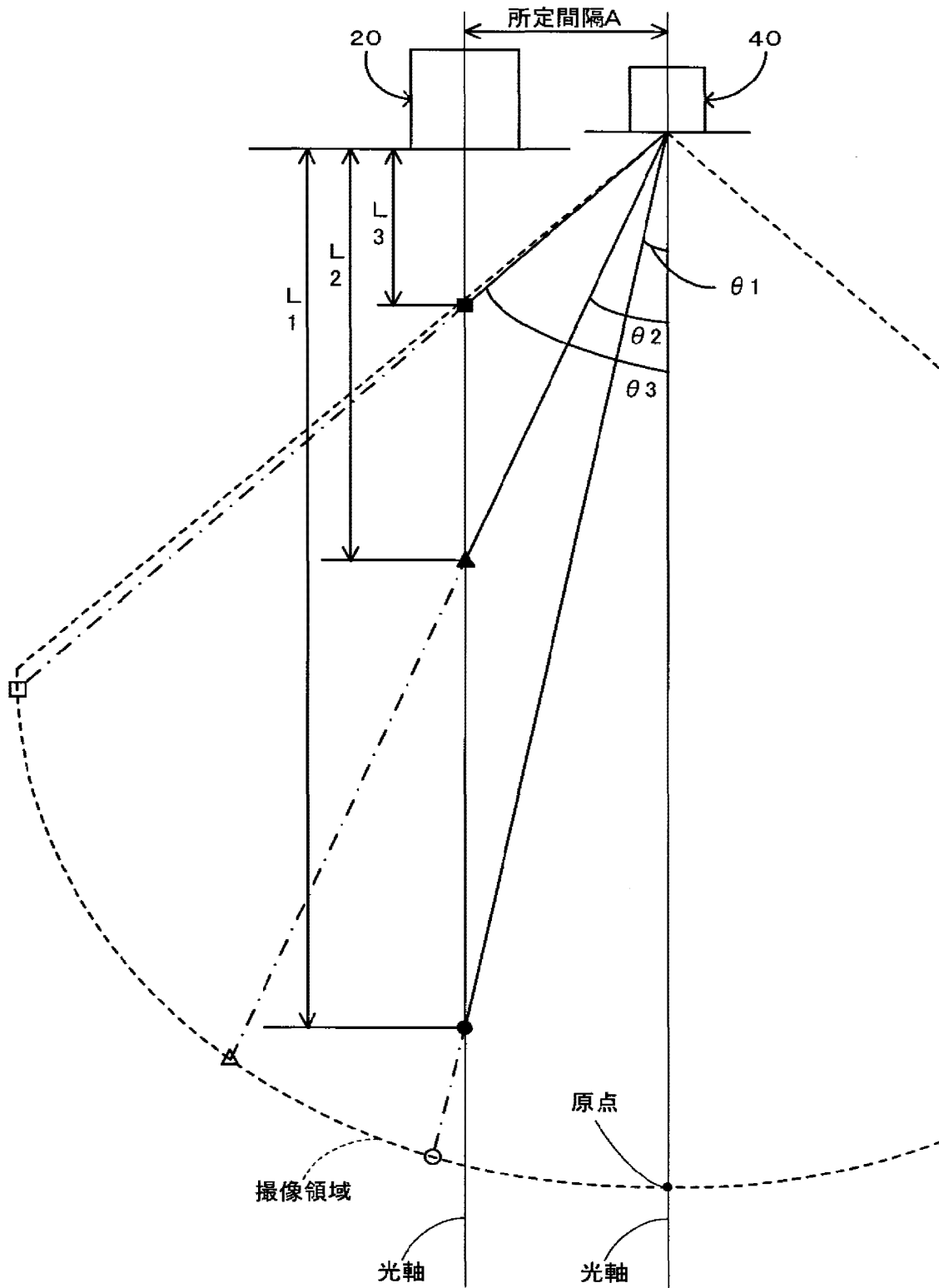
【図2】



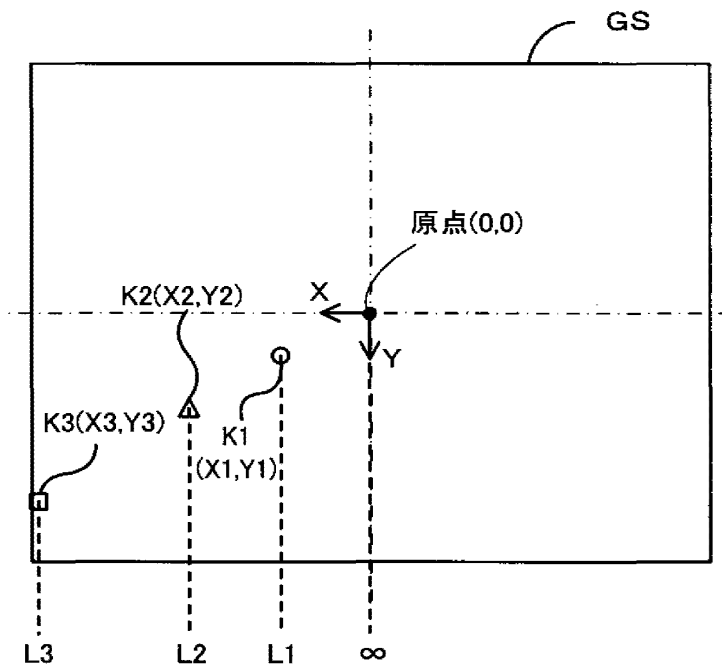
【図3】



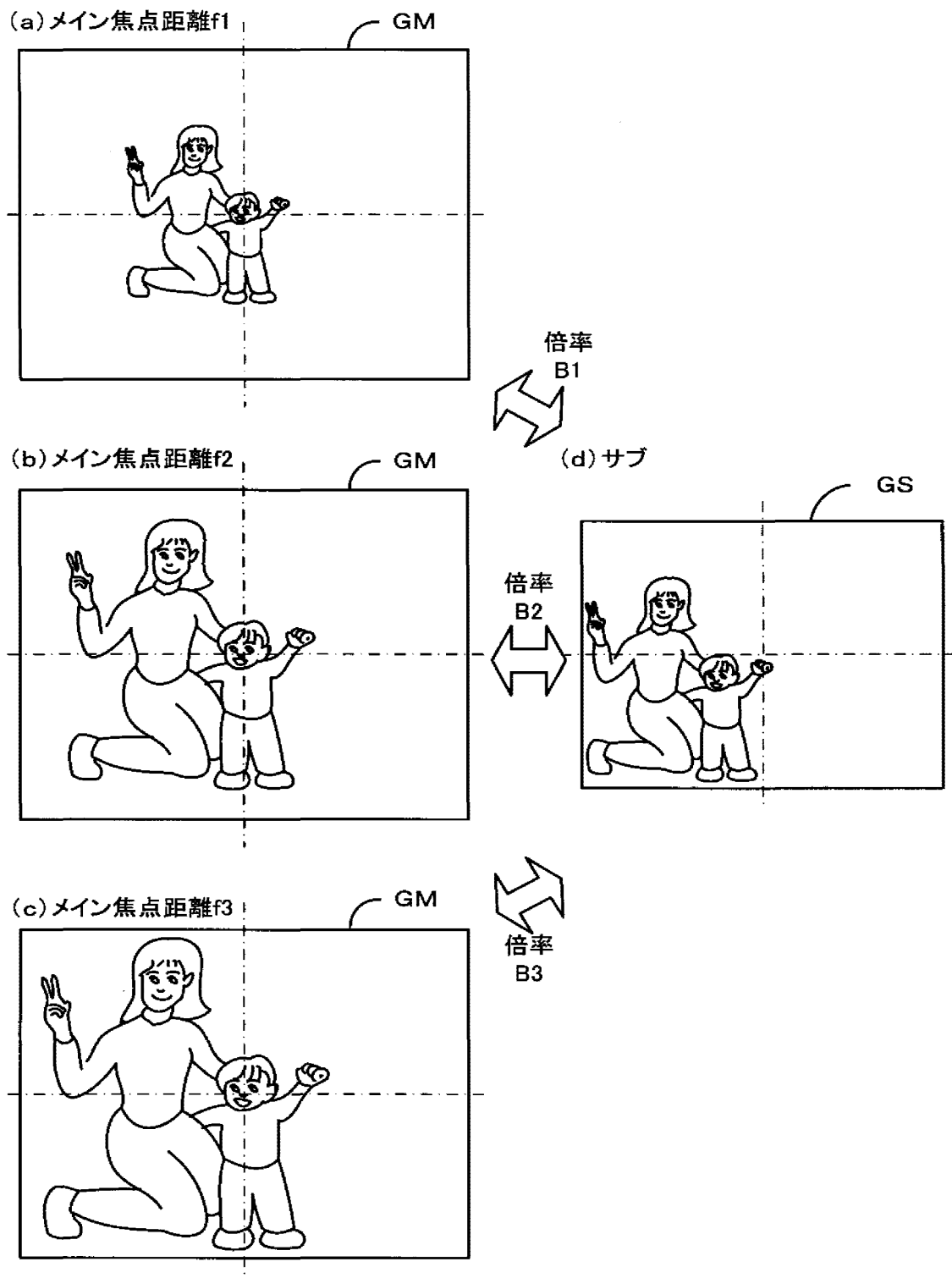
【図4】



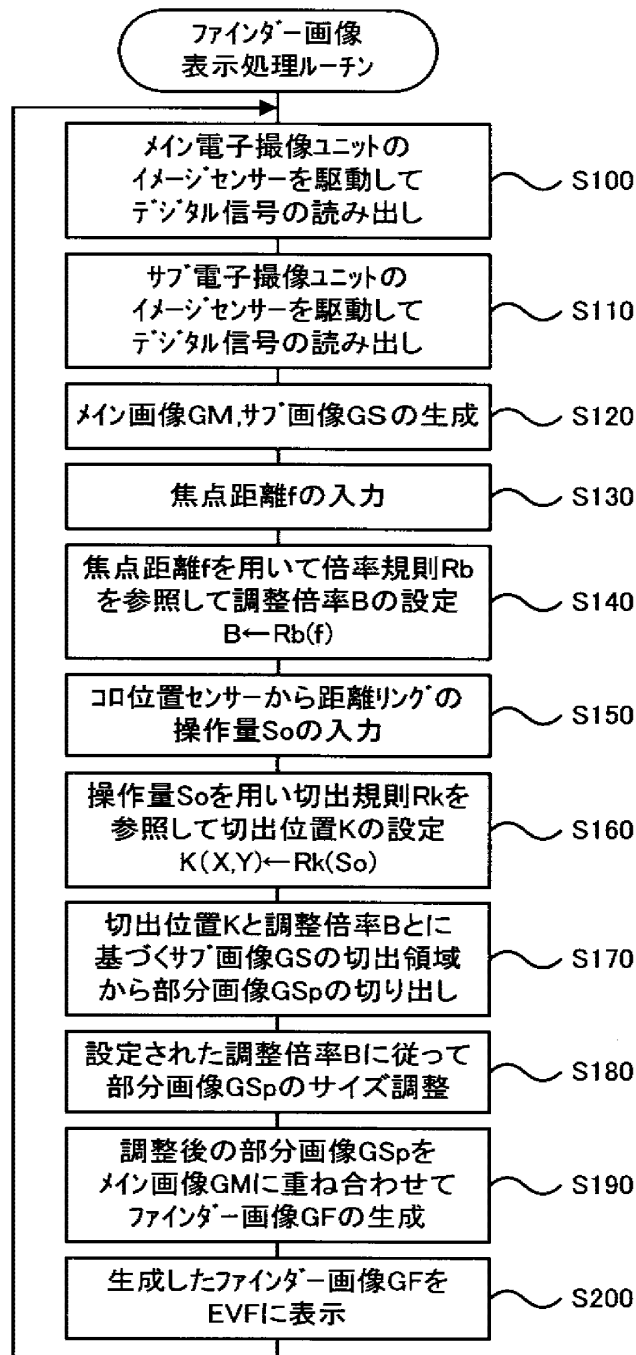
【図 5】



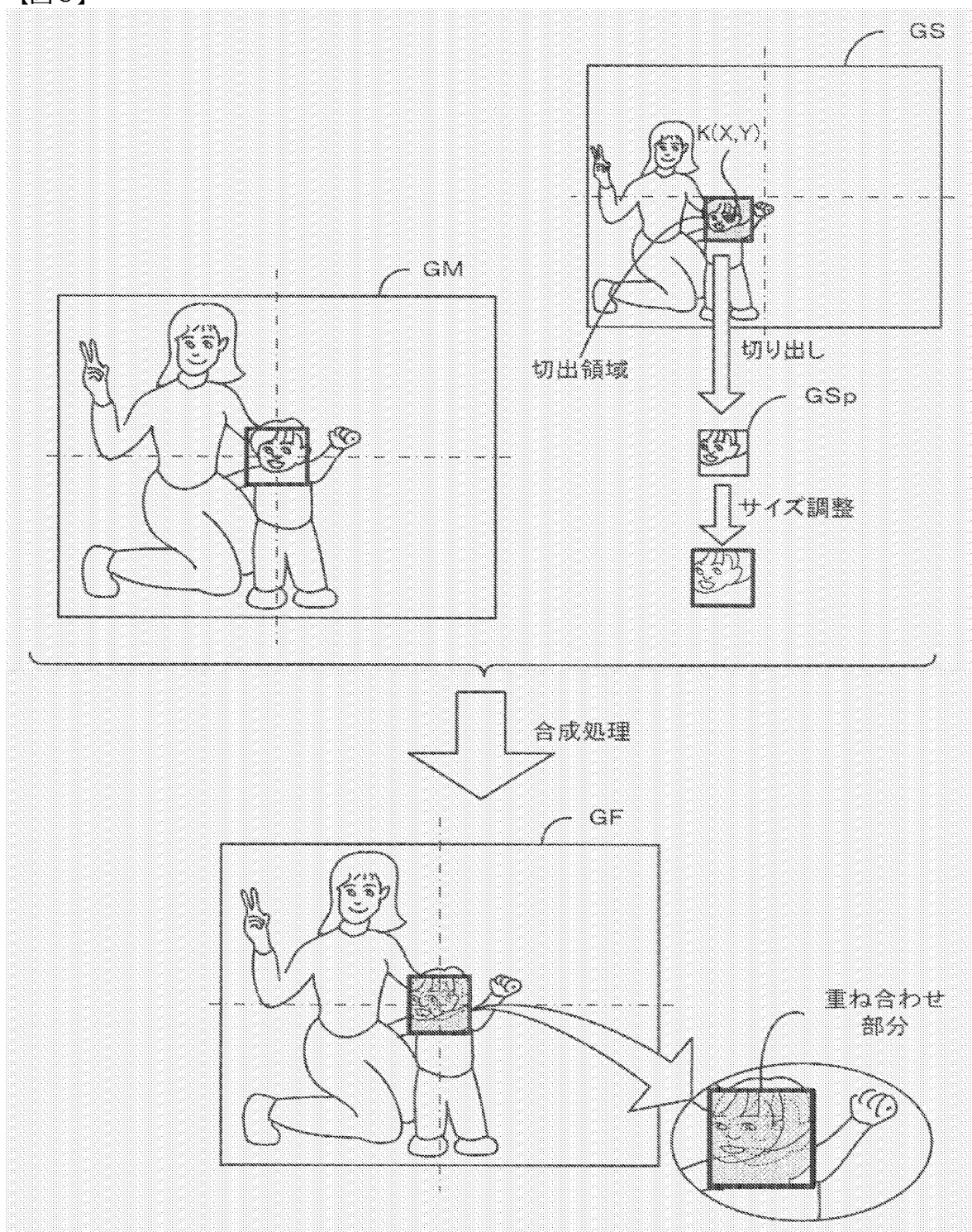
【図6】



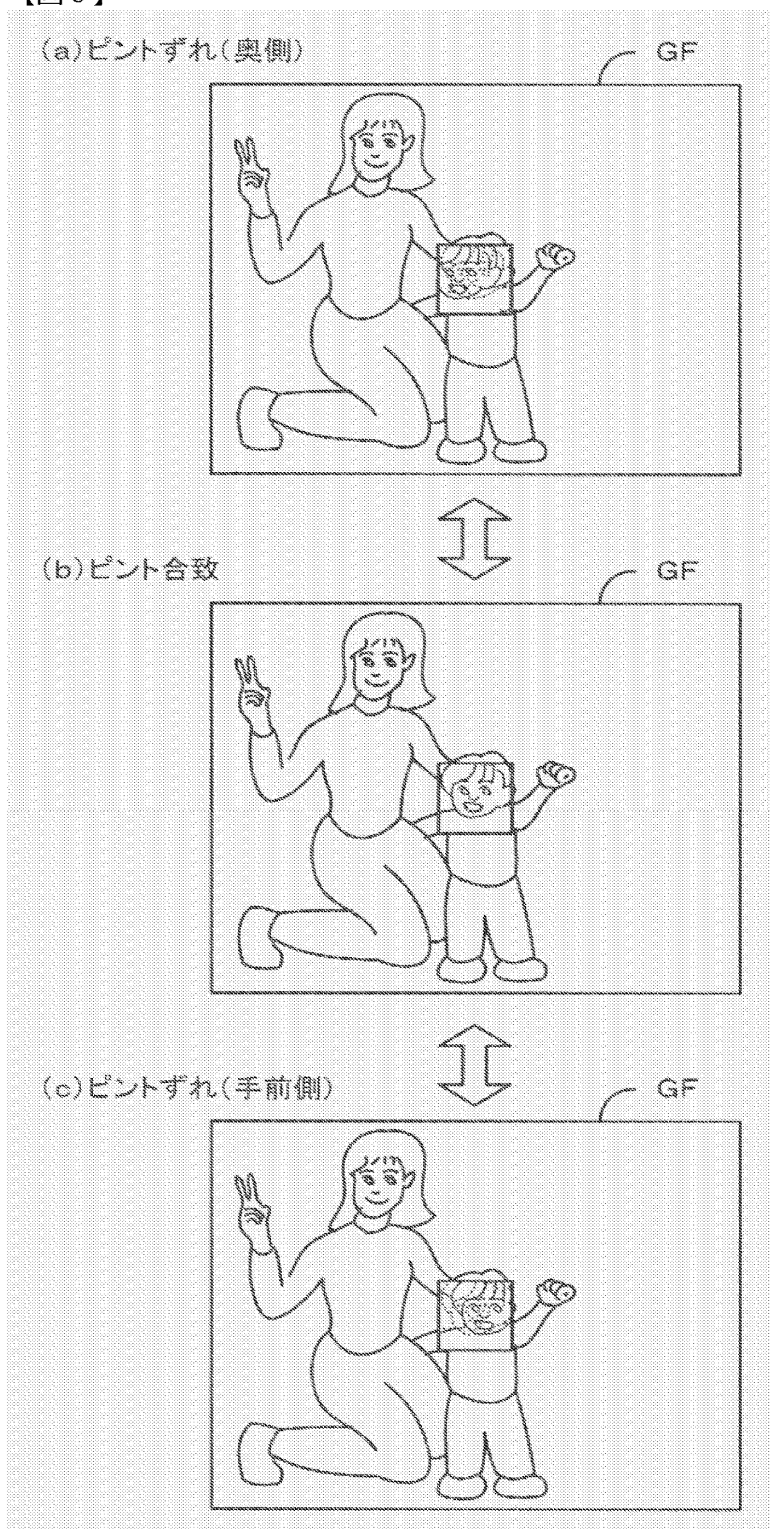
【図 7】



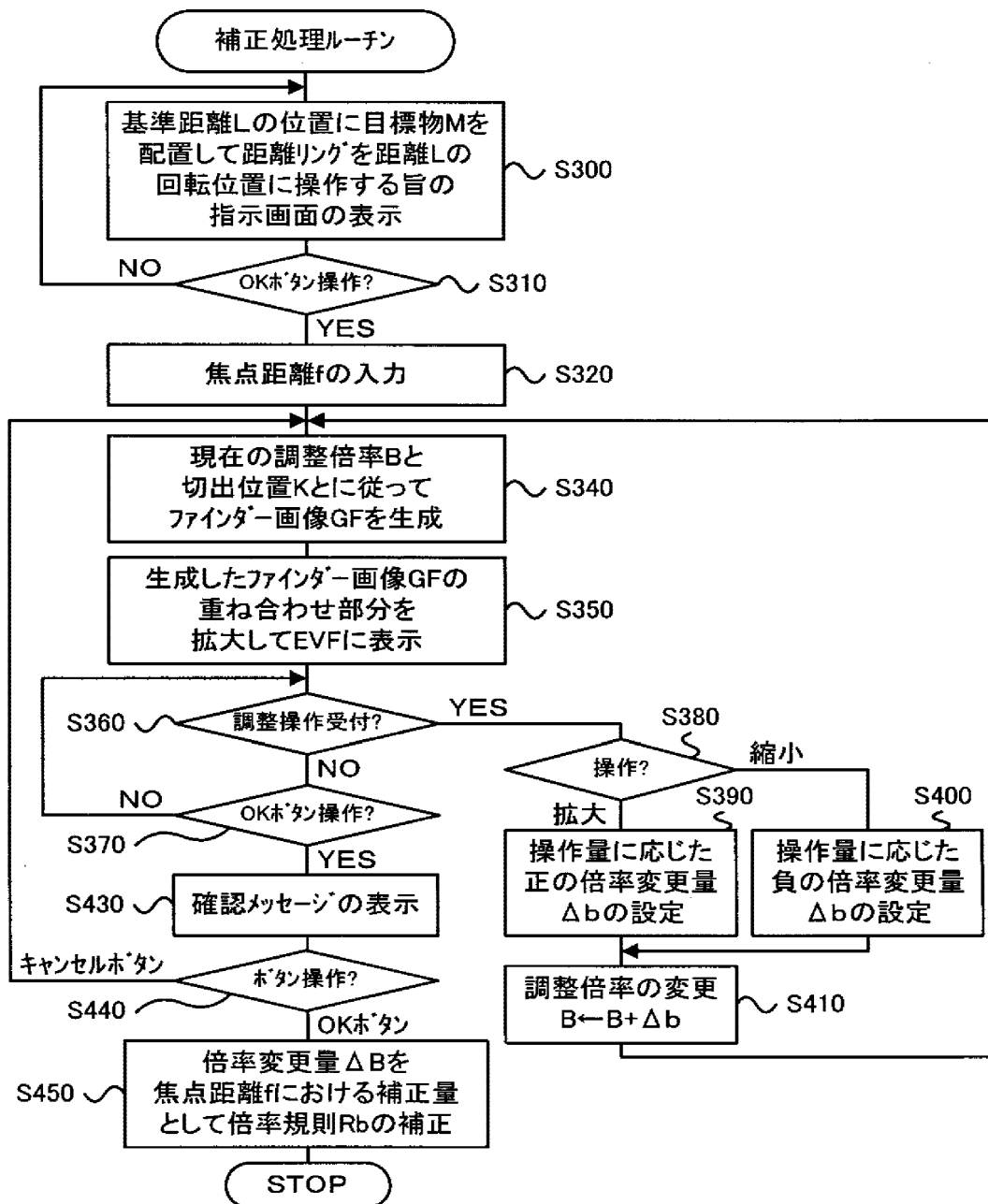
【図8】



【図9】

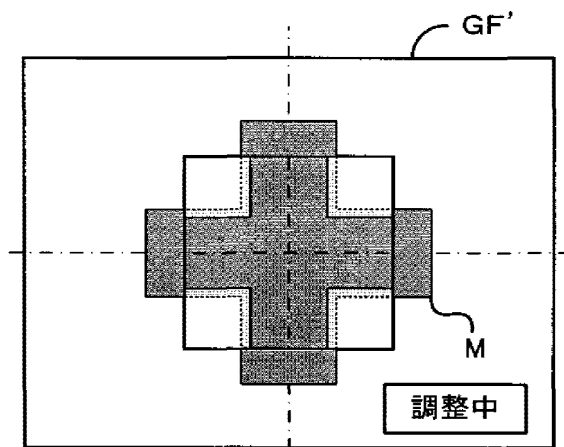


【図10】

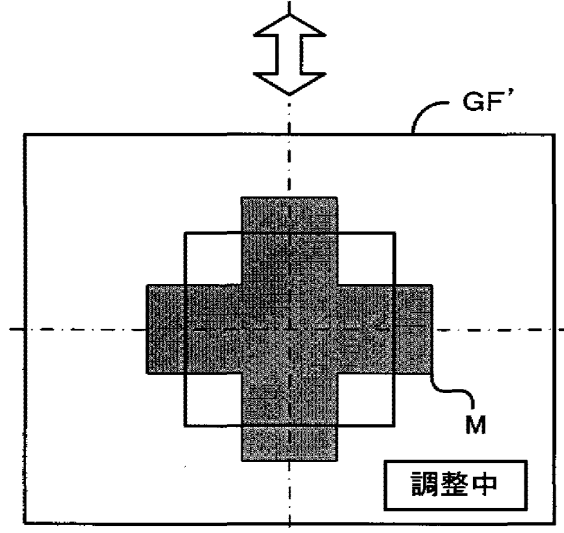


【図 11】

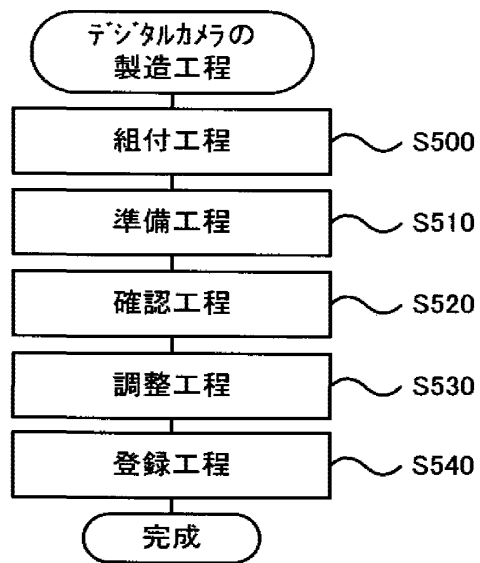
(a)



(b)



【図 1 2】



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/976,048	12/22/2010	Ryuichi SHIOHARA	SE-US105228	6698
22919 7590 06/22/2012 GLOBAL IP COUNSELORS, LLP 1233 20TH STREET, NW, SUITE 700 WASHINGTON, DC 20036-2680			EXAMINER GEBRIEL, SELAM T	
			ART UNIT 2622	PAPER NUMBER
			NOTIFICATION DATE 06/22/2012	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailpto@giplaw.com

DETAILED ACTION

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 – 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Ochi et al. [US 2008/0084484 A].

Regarding 1: Ochi discloses a digital camera (Figures 1 – 3 Electronic Camera) having a focusing function and a focal length varying function of a main lens (Figures 1 – 3), the digital camera (Figures 1 – 3 Electronic Camera) comprising:

A main imaging unit (Figure 3 First Image Pickup Section 41) configured to generate a main image by performing a photoelectric conversion from a subject obtained via the main lens (Figure 2 Lens 12) [Page 4 Section 0060 and 0061: The first image pickup section 41 includes the first image sensor 23, a first analog processing section 41a, and a first digital processing section 41b. The first image sensor 23 is a sensor for generating an intended image that is a recording-purpose image. The first image sensor 23 photoelectrically converts a light flux passing through the lens unit 12 during release period and outputs an analog image signal of the intended image.];

A sub-imaging unit (Figure 3 First Image Pickup Section 42) configured to generate a sub-image by performing a photoelectric conversion from the subject obtained via a sub-lens (Figure 2 Lens 29) [Page 4 Section 0064 and 0065 “The second image pickup section 42 includes the second image sensor 30, a second analog processing section 42a, and a second digital processing section 42b. The second image sensor 30 photoelectrically converts a subject image formed passing through the lens 29, at predetermined intervals and outputs a through image (view confirming image).”];

A focal length acquiring unit (CPU 50) configured to acquire the focal length of the main lens [Page 8 Section 0117 “the CPU 50 executes the following calculations in S203. First, the CPU 50 calculates the subject distance from the position of the focus lens 16 of the lens unit 12 (or the position of a focus lens contained in the lens 29). Next, the CPU 50 calculates the field angles of the first image pickup section 41 and the second image pickup section 42, respectively, based on the data of the focal length of the zoom lens 15 and the data of the focal length of the lens 29. Then, the CPU 50 calculates the range of a view confirming image coinciding with the photographing area of the first image pickup section 41 based on the distance (base length) between the optical axis of the lens unit 12 and the optical axis of the lens 29, the field angles of the first image pickup section 41 and second image pickup section 42, and the subject distance”];

A magnification setting unit (Figure 1 CPU 50) configured to set a level of magnification on the basis of the focal length [Page 8 Section 0125 and 0126 “The

display processing section 50c overlappingly displays an indication of a numerical value of the focal length of the lens 29 onto a view confirming image by means of an on-screen function (see FIG. 9). This allows a user to know, on the view confirming image, what type of lens 29 is mounted. The display processing section 50c overlappingly displays a zoom bar onto a view confirming image by means of an on-screen function (see FIG. 9). This zoom bar indicates a limit range of zooming regarding the second image pickup section 42 (S204) and the current zooming state of the second image pickup section 42. This allows a user to easily know to what extent the magnifying power of the view confirming image can be changed using the zoom switch 48e.”];

A composite image generating unit (Figure 1 CPU 50) configured to generate a composite image (See Figure 11) by combining the main image and the sub-image, after at least one of the main image and the sub-image is magnified at the level of magnification and an image display unit (Figure Monitor 46) configured to display the composite image [Page 9 Section “the CPU 50 changes the display setting flag to the off-state and returns to S201. Then, before photographing the next frame in the second image pickup section 42, the CPU 50 will change the display setting of the view confirming image again (S202 to S205). Accordingly, in the next frame of the view confirming image, the display processing section 50c can execute the frame display reflecting the zoom processing (S209) regarding the second image pickup section 42. Specifically, in conjunction with zooming of the view confirming image by means of the zoom switch 48e, the display processing section 50 changes the size of the frame indicative of the photographing area of the first image pickup section 41. Then, the

display processing section 50 shifts the position of the frame display vertically according to the magnitude of parallax. Here, a display state of the view confirming image when the scene of FIG. 9 is zoomed to the telescopic side is shown in FIG. 10. Moreover, a display state of the view confirming image when the scene of FIG. 9 is zoomed to the wide-angle side is shown in FIG. 11.”].

Regarding claim 2: Ochi further disclose the digital camera according to claim 1, wherein the magnification setting unit is configured to set the level of the magnification in order to match substantially a size of the main image and a size of the sub-image [Page 8 Section 0125 and 0126 “The display processing section 50c overlappingly displays an indication of a numerical value of the focal length of the lens 29 onto a view confirming image by means of an on-screen function (see FIG. 9). This allows a user to know, on the view confirming image, what type of lens 29 is mounted. The display processing section 50c overlapping displays a zoom bar onto a view confirming image by means of an on-screen function (see FIG. 9). This zoom bar indicates a limit range of zooming regarding the second image pickup section 42 (S204) and the current zooming state of the second image pickup section 42. This allows a user to easily know to what extent the magnifying.

Regarding claim 3: Ochi further disclose the digital camera according to claim 2, wherein the sub-lens is a pan-focus lens [Page 4 Section 0064 and 0065 “The second image pickup section 42 includes the second image sensor 30, a second analog processing section 42a, and a second digital processing section 42b. The second image sensor 30 photoelectrically converts a subject image formed passing through the

lens 29, at predetermined intervals and outputs a through image (view confirming image).”];

Regarding claim 4: Ochi further disclose the digital camera according to claim 2, wherein the magnification setting unit (CPU 50) is configured to set the level of the magnification in a correction mode in which a predetermined magnification rule applies in setting the level of the magnification, and the digital camera further includes an instruction receiving unit configured to receive an instruction to change the level of the magnification such that difference between the size of the main image and the size of the sub-image in the composite image is less than or equal to a predetermined amount in the correction mode, and a correcting unit (CPU 50) configured to correct the magnification rule by using amount to change the level of the magnification as amount of correction in the correction mode, when the focal length of the main lens is in predetermined length [Page 8 Section 00113 – 00120 “the CPU 50 executes the following calculations in S203. First, the CPU 50 calculates the subject distance from the position of the focus lens 16 of the lens unit 12 (or the position of a focus lens contained in the lens 29). Next, the CPU 50 calculates the field angles of the first image pickup section 41 and the second image pickup section 42, respectively, based on the data of the focal length of the zoom lens 15 and the data of the focal length of the lens 29. Then, the CPU 50 calculates the range of a view confirming image coinciding with the photographing area of the first image pickup section 41 based on the distance (base length) between the optical axis of the lens unit 12 and the optical axis of the lens 29,

the field angles of the first image pickup section 41 and second image pickup section 42, and the subject distance”].

Regarding claim 5: Ochi further disclose the digital camera according to claim 1, further comprising an focusing amount acquiring unit (CPU 50) configured to acquire amount of the focusing, wherein the composite image generating unit is configured to generate the composite image by combining the main image and the sub-image by setting a cutout position on the sub-image, cutting out a partial image from the cut out position, and adding the partial image on the main image, and misalignment of the composite image decreases as the composite image is in focus with the subject on the basis of the amount and a predetermined cutout rule [Page 8 Section 00113 – 00120 “the CPU 50 determines the limit range of zooming regarding the second image pickup section 42 based on the calculation result of S203. For example, if a portion coinciding with the photographing area of the first image pickup section 41 in the view confirming image is larger than an upper limit value, the CPU 50 restricts the zoom operation on the telescopic side regarding the second image pickup section 42. In other words, in the above-described case, an increase in the magnifying power of the view confirming image by means of the optical zoom of the lens 29 or the electronic zoom of the second image pickup section 42 will be restricted. This is because if the field of view of the view confirming image comes too close to the photographing area of the first image pickup section 41, a user cannot observe a wide range of field and thus a benefit of the wide preview display will be lost.”].

Regarding claim 6: Ochi further disclose the digital camera according to claim 5, wherein the predetermined cutout rule is based on a principle of triangulation based on an interval between the main lens and the sub-lens, and distance from the digital camera to the subject on the basis of the amount [Page 8 Section 00113 – 00120 “the CPU 50 executes the following calculations in S203. First, the CPU 50 calculates the subject distance from the position of the focus lens 16 of the lens unit 12 (or the position of a focus lens contained in the lens 29). Next, the CPU 50 calculates the field angles of the first image pickup section 41 and the second image pickup section 42, respectively, based on the data of the focal length of the zoom lens 15 and the data of the focal length of the lens 29. Then, the CPU 50 calculates the range of a view confirming image coinciding with the photographing area of the first image pickup section 41 based on the distance (base length) between the optical axis of the lens unit 12 and the optical axis of the lens 29, the field angles of the first image pickup section 41 and second image pickup section 42, and the subject distance”].

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SELAM GEBRIEL whose telephone number is (571)270-1652. The examiner can normally be reached on 8:00 AM - 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571)272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

**/SELAM GEBRIEL/
Examiner, Art Unit 2622**

/Sinh Tran/

Supervisory Patent Examiner, Art Unit 2622

Notice of References Cited	Application/Control No. 12/976,048		Applicant(s)/Patent Under Reexamination SHIOHARA, RYUICHI	
	Examiner SELAM GEBRIEL		Art Unit 2622	Page 1 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-4,231,647 A	11-1980	Kitai et al.	396/103
*	B	US-5,682,198 A	10-1997	Katayama et al.	348/47
*	C	US-2003/0020814 A1	01-2003	Ono, Shuji	348/220.1
*	D	US-2003/0160886 A1	08-2003	Misawa et al.	348/347
*	E	US-2005/0134709 A1	06-2005	Ishii et al.	348/240.99
*	F	US-2005/0145772 A1	07-2005	Abe, Nobuaki	250/201.2
*	G	US-2006/0092505 A1	05-2006	Abnet et al.	359/380
*	H	US-2006/0187312 A1	08-2006	Labaziewicz et al.	348/218.1
*	I	US-2007/0064141 A1	03-2007	Misawa et al.	348/333.01
*	J	US-2007/0064142 A1	03-2007	Misawa et al.	348/333.01
*	K	US-2008/0030592 A1	02-2008	Border et al.	348/218.1
*	L	US-2008/0084484 A1	04-2008	Ochi et al.	348/222.1
*	M	US-2008/0158384 A1	07-2008	OKAMOTO et al.	348/231.2

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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	V	
	W	
	X	

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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Notice of References Cited	Application/Control No. 12/976,048	Applicant(s)/Patent Under Reexamination SHIOHARA, RYUICHI	
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U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2008/0158346 A1	07-2008	Okamoto et al.	348/47
*	B	US-2008/0218613 A1	09-2008	Janson et al.	348/262
*	C	US-2009/0153649 A1	06-2009	HIROOKA et al.	348/47
	D	US-			
	E	US-			
	F	US-			
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	H	US-			
	I	US-			
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	K	US-			
	L	US-			
	M	US-			

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
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	S					
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	V	
	W	
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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<i>Index of Claims</i> 	Application/Control No. 12976048	Applicant(s)/Patent Under Reexamination SHIOHARA, RYUICHI
	Examiner SELAM GEBRIEL	Art Unit 2622

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	06/17/2012								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	105	((RYUICHI) near2 (SHIOHARA)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2012/06/17 15:43
L2	407230	SEI KO.as. or EPSON.as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 15:46
L3	407234	L1 or L2	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 15:46
L4	3	L3 and pan near3 focus\$4 lens	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 15:46
L5	67	pan near3 focus\$4 lens	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 15:47
L6	79	pan near3 focus\$4 (lens or optical)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 15:48
L7	1	pan near3 focus\$4 (lens or optical) and sub-imaging	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 15:48
L8	9	pan near3 focus\$4 (lens or optical) and (first and second)near3 (imager or CCD or imaging or CMOS)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	ADJ	ON	2012/06/17 15:49

			DERWENT; IBM_TDB			
L9	65	pan near3 (lens or optical) and (first and second)near3 (imager or CCD or imaging or CMOS)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 15:51
L10	25	pan near3 (lens or optical) and (first and second)(imager or CCD or imaging or CMOS)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 15:51
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L13	41	("6359649" "20060125934" "6710801" "6292221" "7057647" "6050938" "6937284" "5905525" "5436660" "7248301" "7796183" "20020167589" "6198505" "6636254" "6812968" "4599653" "20020152557" "7324151" "7286177").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 16:00
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L15	5546	(first and second)(imager or CCD or imaging or CMOS or photographing or image pickup or image pickup)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 16:01
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L17	61	focus misalignment	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	ADJ	ON	2012/06/17 16:05

			IBM_TDB			
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L20	0	(first and second)(imager or CCD or imaging or CMOS or photographing or image pickup or image pickup) and L17	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 16:08
L21	62	(first and second)(imager or CCD or imaging or CMOS or photographing or image pickup or image pickup) and manual focus\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 16:09
L22	50	("20040223191" "20050270399" "20060066744" "20060119714" "20060193509" "20070097460" "20070268369" "20080074531" "20080218613" "20090122151" "20090153649" "20100188579" "20110234885" "6297846" "6362852" "6731799" "6900841" "7512262" "7783186" "7801331" "7864240" "7978879").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 16:17
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L24	1744	348/42,47,48.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 16:46
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L26	790	348/333.1-333.12.ccls.	US-PGPUB;	ADJ	ON	2012/06/17

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			16:47
L27	3090	348/345-356.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 16:47
L28	0	L24 and L25 and L26 and L27	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 16:48
L29	0	L24 and L26 and L27	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 16:48
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L31	2	((first and second) or pair or dual or two)(imager or CCD or imaging or CMOS or photographing or image pickup or image pickup) and L17	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 16:49
L32	21744	((first and second) or pair or dual or two)(imager or CCD or imaging or CMOS or photographing or image pickup or image pickup)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 16:49
L33	422	L32 and L30	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 16:50
L34	22	("20040087773" "20020075258" "20030202113" "5668597" "6078701" "5164831" "5436660" "5657402" "20030227556" "20040017386" "6549215").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	ADJ	ON	2012/06/17 16:50

			IBM_TDB			
L35	39	manual focus\$4 and L33	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 16:51
L36	3840	Focal length same magnif\$6	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 16:55
L37	66	L32 and L36	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 16:55
L38	1	"12976048"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 17:22
L39	43	pan-focus lens	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 17:40
L40	0	pan-focus lens near5 advantage	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 17:41
L41	43	pan-focus lens	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 17:41
L42	1295	((first and second) or pair or dual or two)(imager or CCD or imaging or CMOS or photographing or image pickup or image pickup) and focal length and magnification	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 17:53
L43	0	((first and second) or pair or dual or two)(imager or CCD or imaging or CMOS or photographing or image pickup or image pickup) and focal length and	US-PGPUB; USPAT; USOCR; FPRS; EPO;	ADJ	ON	2012/06/17 17:54

EAST Search History

		magnification and "20080084484"	JPO; DERWENT; IBM_TDB			
L44	2	((first and second) or pair or dual or two)(imager or CCD or imaging or CMOS or photographing or image pickup or image pickup) and focal length and magnif\$8 and "20080084484"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/06/17 17:55

EAST Search History (Interference)

< This search history is empty >

6/ 17/ 2012 6:15:29 PM

C:\ Users\ sgebriel\ Documents\ EAST\ Workspaces\ Application_12976156.wsp

<i>Search Notes</i> 	Application/Control No. 12976048	Applicant(s)/Patent Under Reexamination SHIOHARA, RYUICHI
	Examiner SELAM GEBRIEL	Art Unit 2622

SEARCHED			
Class	Subclass	Date	Examiner
348	345-356,42,47,48,51,333.01	6/17/2012	S.G.

SEARCH NOTES		
Search Notes	Date	Examiner
Inventership Search Is Performed	6/17/2012	S.G.
See East Search History For Text Search	6/17/2012	S.G.

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

/SELAM GEBRIEL/ Examiner.Art Unit 2622	6/17/2012
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CONFIRMATION NO. 6698

SERIAL NUMBER 12/976,048	FILING or 371(c) DATE 12/22/2010 RULE	CLASS 348	GROUP ART UNIT 2622	ATTORNEY DOCKET NO. SE-US105228		
APPLICANTS Ryuichi SHIOHARA, Matsumoto, JAPAN; ** CONTINUING DATA ***** NONE S.G. ** FOREIGN APPLICATIONS ***** NONE S.G. JAPAN 2009-295202 12/25/2009 ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 01/06/2011						
Foreign Priority claimed ☒ Yes ☐ No 35 USC 119(a-d) conditions met ☒ Yes ☐ No Verified and /SELAM T GEBRIEL/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY JAPAN	SHEETS DRAWINGS 11	TOTAL CLAIMS 6	INDEPENDENT CLAIMS 1
ADDRESS GLOBAL IP COUNSELORS, LLP 1233 20TH STREET, NW, SUITE 700 WASHINGTON, DC 20036-2680 UNITED STATES						
TITLE DIGITAL CAMERA AND METHOD FOR MANUFACTURING SAME						
FILING FEE RECEIVED 1090	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		☐ All Fees			
			☐ 1.16 Fees (Filing)			
			☐ 1.17 Fees (Processing Ext. of time)			
			☐ 1.18 Fees (Issue)			
			☐ Other _____			
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12976048 - GAU: 2622

Approved for use through 10/31/2007. OMB 0651-0031

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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number. Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>				Complete if Known	
				Application Number	New Application
				Filing Date	Herewith
				First Named Inventor	Ryuichi SHIOHARA
				Art Unit	
				Examiner Name	
Sheet	1	of	1	Attorney Docket Number	SE-US105228

[illegible]

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T ⁶
		Country Code ³ -Number ⁴ -Kind Code ⁵ (if known)	MM-DD-YYYY			
		JP-2002-122907-A	04-26-2002	Takahashi et al.		✓

Examiner Signature	/Selam Gebriel/ (06/17/2012)	Date Considered	06/17/2012
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /S.G./

SE-US105228

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	Attn: Mail Stop Amendment
	:	
Ryuichi SHIOHARA	:	Patent Art Unit: 6698
	:	
Serial No. 12/976,048	:	Examiner: Selam T. Gebriel
	:	
Filed: December 22, 2010	:	Confirmation No. 6698
	:	
For: DIGITAL CAMERA AND METHOD FOR:	:	
MANUFACTURING SAME	:	

THE ASSISTANT COMMISSIONER FOR PATENTS

Sir:

Transmitted herewith is an Amendment in the above-identified application:

The fee has been calculated as shown below:

CLAIMS				SMALL ENTITY		OTHER THAN A SMALL ENTITY	
REMAINING AFTER AMENDMENT	HIGHEST NO. PREVIOUSLY PAID FOR	PRESENT EXTRA		ADDIT. RATE	FEE	ADDIT. RATE	FEE
TOTAL 7	- 20	=	0	x 30 = \$		x 60 = \$	
INDEP 1	- 3	=	0	x 125 = \$		x 250 = \$	
[] 1ST PRESENTATION OF MULT. DEP. CLAIM				+ 225 = \$		+ 450 = \$	
				TOTAL \$		TOTAL \$	

[X] The Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 50-1836.

[X] Any additional excess claim fees under 37 C.F.R. 1.16.

[X] Any additional patent application processing fees under 37 C.F.R. 1.17.

Dated: September 24, 2012/Akiyoshi Onda/

Akiyoshi Onda

Reg. No. 63,773

GLOBAL IP COUNSELORS, LLP
1233 Twentieth Street, NW, Suite 700
Washington, DC 20036
(202) 293-0444

S:\09-SEP12-MSM\SE-US105228 Amendment Cover.doc

SE-US105228

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	Mailstop: Amendment
	:	
Ryuichi SHIOHARA	:	Art Unit: 6698
	:	
Serial No.: 12/976,048	:	Examiner: Selam T. Gebriel
	:	
Filed: December 22, 2010	:	Confirmation No. 6698
	:	
For: DIGITAL CAMERA AND METHOD FOR	:	
MANUFACTURING SAME	:	

AMENDMENT UNDER 37 CFR §1.111

Assistant Commissioner of Patents
Washington, DC 20231

Sir:

In response to the June 22, 2012 Office Action, please amend the above-identified patent application as follows:

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the *Listing of Claims*, which begins on page 3 of this paper. Claims 1-7 are pending, with claim 1 being the only independent claim.

Remarks/Arguments begin on page 6 of this paper.

Appl. No. 12/976,048
Amendment dated September 24, 2012
Reply to Office Action of June 22, 2012

AMENDMENTS TO THE SPECIFICATION:

Please replace the title of the invention on page 1 with the following rewritten version:

DIGITAL CAMERA GENERATING COMPOSITE IMAGE FROM MAIN IMAGE
AND SUB-IMAGE, AND METHOD FOR MANUFACTURING SAME

The following Listing of Claims will replace all prior versions, and listings, of claims in the application.

LISTING OF CLAIMS:

1. (Original) A digital camera having a focusing function and a focal length varying function of a main lens, the digital camera comprising:
 - a main imaging unit configured to generate a main image by performing a photoelectric conversion from a subject obtained via the main lens;
 - a sub-imaging unit configured to generate a sub-image by performing a photoelectric conversion from the subject obtained via a sub-lens;
 - a focal length acquiring unit configured to acquire the focal length of the main lens;
 - a magnification setting unit configured to set a level of magnification on the basis of the focal length;
 - a composite image generating unit configured to generate a composite image by combining the main image and the sub-image, after at least one of the main image and the sub-image is magnified at the level of magnification; and
 - an image display unit configured to display the composite image.
2. (Original) The digital camera according to claim 1, wherein the magnification setting unit is configured to set the level of the magnification in order to match substantially a size of the main image and a size of the sub-image.
3. (Original) The digital camera according to claim 2, wherein the sub-lens is a pan-focus lens.

4. (Original) The digital camera according to claim 2, wherein
the magnification setting unit is configured to set the level of the magnification in a
correction mode in which a predetermined magnification rule applies in setting the level of
the magnification, and
the digital camera further includes
an instruction receiving unit configured to receive an instruction to change the level of
the magnification such that difference between the size of the main image and the size of the
sub-image in the composite image is less than or equal to a predetermined amount in the
correction mode, and
a correcting unit configured to correct the magnification rule by using amount to
change the level of the magnification as amount of correction in the correction mode, when
the focal length of the main lens is in predetermined length.

5. (Original) The digital camera according to claim 1, further comprising
an focusing amount acquiring unit configured to acquire amount of the focusing,
wherein
the composite image generating unit is configured to generate the composite image by
combining the main image and the sub-image by setting a cutout position on the sub-image,
cutting out a partial image from the cut out position, and adding the partial image on the main
image, and
misalignment of the composite image decreases as the composite image is in focus
with the subject on the basis of the amount and a predetermined cutout rule.

6. (Original) The digital camera according to claim 5, wherein

the predetermined cutout rule is based on a principle of triangulation based on an interval between the main lens and the sub-lens, and distance from the digital camera to the subject on the basis of the amount.

7. (New) The digital camera according to claim 1, wherein
the main image of the object is captured from a different angle from the sub-image of the subject.

REMARKS

In the June 22, 2012 Office Action, the specification was objected to and claims 1-6 stand rejected in view of prior art. No other objections or rejections were made in the Office Action.

Status of Claims and Amendments

In response to the June 22, 2012 Office Action, Applicant respectfully traverses the rejections. Also, Applicant has added new claim 7. Thus, claims 1-7 are pending, with claim 1 being the only independent claim. Reexamination and reconsideration of the pending claims are respectfully requested in view of above amendments and the following comments.

Specification

On page 2 of the Office Action, the specification was objected to because the title of the invention was not clearly descriptive. In response, Applicant has amended the title of the invention as mentioned above.

Withdrawal of the objections is respectfully requested.

Rejections - 35 U.S.C. § 102

On pages 2-8 of the Office Action, claims 1-6 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Application Publication No. 2008-0084484 (Ochi et al.). In response, Applicant respectfully traverses the rejections.

More specifically, claim 1 requires, at least:

a main imaging unit configured to **generate a main image by performing a photoelectric conversion from a subject obtained via the main lens;**

a sub-imaging unit configured to **generate a sub-image by performing a photoelectric conversion from the subject obtained via a sub-lens;**

a focal length acquiring unit configured to acquire the focal length of the main lens;

a magnification setting unit configured to set a level of magnification on the basis of the focal length;

a composite image generating unit configured to generate a **composite image by combining the main image and the sub-image**, after at least one of the main image and the sub-image is magnified at the level of magnification; and

an image display unit configured to **display the composite image**.

The Office Action indicates that Ochi et al. anticipate the claimed invention; however, Applicant disagrees. What Ochi et al. teach is to solve problems which are caused because an angle of an interchangeable lens 29 is wider than an angle of a lens unit 12. In order to solve the problems, as we can see from Fig. 11 of Ochi et al., merely a frame is displayed in the image. The Office Action appears to view the frame being equivalent to the sub-image of the claimed invention. However, as recited in claim 1, the **sub-image** is obtained by **performing the photoelectric conversion from the subject obtained via the sub-lens**.

Applicant respectfully asserts that the frame can not be the sub-image simply because **the frame is not generated by photoelectric conversion**. Therefore, although the Office Action indicates that the composite image is disclosed in Fig. 11 of Ochi et al., Ochi et al. are indeed silent with regards to the sub-image and the composite image.

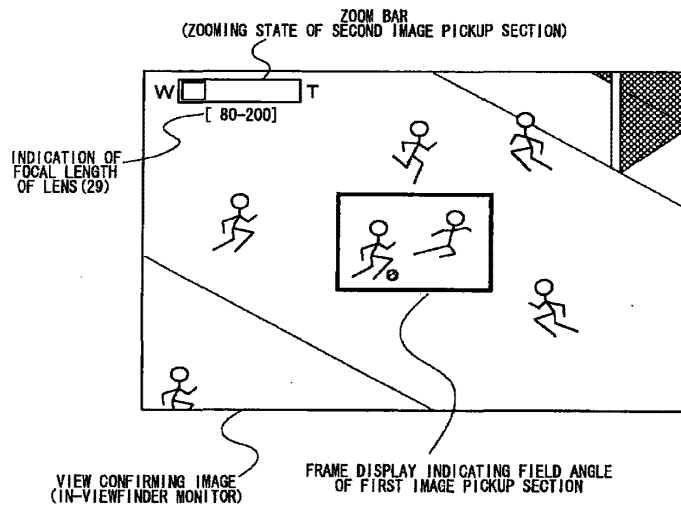


FIG. 11

Clearly, the above mentioned arrangements are not disclosed or suggested by Ochi et al. or any other prior art of record. It is well settled under U.S. patent law that for a reference to anticipate a claim, the reference must disclose **each element** of the claim within the reference. Therefore, Applicant respectfully submits that claim 1, as now amended, is not anticipated by the prior art of record. Withdrawal of this rejection is respectfully requested.

Moreover, Applicant believes that dependent claims 2-6 are also allowable over the prior art of record in that they depend from independent claim 1, and therefore are allowable for the reasons stated above. Also, claims 2-6 are further allowable because they include additional limitations. Thus, Applicant believes that since the prior art of record does not anticipate the independent claim 1, neither does the prior art anticipate the dependent claims.

Applicant respectfully requests withdrawal of the rejections.

New Claims

Appl. No. 12/976,048
Amendment dated September 24, 2012
Reply to Office Action of June 22, 2012

Applicant has added new claim 7 by the current Amendment.

Claim 7 recites that the main image of the object is captured from a different angle from the sub-image of the subject.

Examination of claim 7 is respectfully requested.

* * *

In view of the foregoing amendment and comments, Applicant respectfully asserts that claims 1-7 are now in condition for allowance. Reexamination and reconsideration of the pending claims are respectfully requested.

Respectfully submitted,

/ Akiyoshi Onda /
Akiyoshi Onda
Reg. No. 63,773

GLOBAL IP COUNSELORS, LLP
1233 Twentieth Street, NW, Suite 700
Washington, DC 20036
(202)-293-0444
Dated: September 24, 2012

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Electronic Acknowledgement Receipt	
EFS ID:	13818850
Application Number:	12976048
International Application Number:	
Confirmation Number:	6698
Title of Invention:	DIGITAL CAMERA AND METHOD FOR MANUFACTURING SAME
First Named Inventor/Applicant Name:	Ryuichi SHIOHARA
Customer Number:	22919
Filer:	David L. Tarnoff/Megumi McKeever
Filer Authorized By:	David L. Tarnoff
Attorney Docket Number:	SE-US105228
Receipt Date:	24-SEP-2012
Filing Date:	22-DEC-2010
Time Stamp:	14:15:09
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		SE-US105228_Amendment.PDF	98804 80adb2dd786d443730dc079bb34bdd113cf1228a	yes	10

Multipart Description/PDF files in .zip description			
	Document Description	Start	End
	Amendment/Req. Reconsideration-After Non-Final Reject	1	2
	Specification	3	3
	Claims	4	6
	Applicant Arguments/Remarks Made in an Amendment	7	10
Warnings:			
Information:			
Total Files Size (in bytes):		98804	
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 12/976,048		Filing Date 12/22/2010		☐ To be Mailed	
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)			SMALL ENTITY ☐ OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A				
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A				
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =		OR	X \$ =				
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =			X \$ =				
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	09/24/2012	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
Total (37 CFR 1.16(i))	*	7	Minus	** 20	=	0	OR	X \$60=	0	
Independent (37 CFR 1.16(h))	*	1	Minus	*** 3	=	0	OR	X \$250=	0	
☐ Application Size Fee (37 CFR 1.16(s))										
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0	
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	Total (37 CFR 1.16(i))	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	*	Minus	**	=	X \$ =		OR	X \$ =		
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =	OR	X \$ =		
☐ Application Size Fee (37 CFR 1.16(s))										
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.										
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".										
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".										
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.										

Legal Instrument Examiner:
/FREDERICK BRISCOE/

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EXAMINER

GEBRIEL, SELAM T

ART UNIT

PAPER NUMBER

2661

DATE MAILED: 03/07/2013

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/976,048	12/22/2010	Ryuichi SHIOHARA	SE-US105228	6698

TITLE OF INVENTION: DIGITAL CAMERA AND METHOD FOR MANUFACTURING SAME

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1770	\$300	\$0	\$2070	06/07/2013

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

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B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

22919 7590 03/07/2013
GLOBAL IP COUNSELORS, LLP
1233 20TH STREET, NW, SUITE 700
WASHINGTON, DC 20036-2680

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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12/976,048	12/22/2010	Ryuichi SHIOHARA	SE-US105228	6698
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TITLE OF INVENTION: DIGITAL CAMERA AND METHOD FOR MANUFACTURING SAME

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1770	\$300	\$0	\$2070	06/07/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
GEBRIEL, SELAM T	2661	348-345000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/976,048	12/22/2010	Ryuichi SHIOHARA	SE-US105228	6698
22919 7590 03/07/2013 GLOBAL IP COUNSELORS, LLP 1233 20TH STREET, NW, SUITE 700 WASHINGTON, DC 20036-2680				
EXAMINER GEBRIEL, SELAM T				
ART UNIT			PAPER NUMBER	

2661

DATE MAILED: 03/07/2013

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 161 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 161 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Notice of Allowability	Application No.	Applicant(s)	
	12/976,048	SHIOHARA, RYUICHI	
	Examiner	Art Unit	
	SELAM GEBRIEL	2661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Papers Filed on 09/24/2012.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1 and 3-7(Now Renumered From 1-6). As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☒ All b) ☐ Some* c) ☐ None of the:

1. ☒ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. ____.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)	5. ☒ Examiner's Amendment/Comment
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date ____	6. ☒ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material	7. ☐ Other ____.
4. ☒ Interview Summary (PTO-413), Paper No./Mail Date ____.	

/TUAN HO/ Primary Examiner, Art Unit 2661	
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DETAILED ACTION

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Akiyoshi Onda on 02/28/2013.

Amendment

Cancel claim 2

Claim 1. A digital camera having a focusing function and a focal length varying function of a main lens, the digital camera comprising:

a main imaging unit configured to generate a main image by performing a photoelectric conversion from a subject obtained via the main lens;

a sub-imaging unit configured to generate a sub-image by performing a photoelectric conversion from the subject obtained via a sub-lens;

a focal length acquiring unit configured to acquire the focal length of the main lens;

a magnification setting unit configured to set a level of magnification on the basis of the focal length;

a composite image generating unit configured to generate a composite image by combining the main image and the sub-image, after at least one of the main image and the sub-image is magnified at the level of magnification; ~~and~~

an image display unit configured to display the composite image; and
wherein the magnification setting unit is configured to set the level of the
magnification in order to match substantially a size of the main image and a size
of the sub-image.

Allowable Subject Matter

Claims 1 and 3 – 7 are allowed.

Reason for Allowance

The following is an examiner's statement of reasons for allowance:

Regarding claim 1: The prior art of alone or in combination does not disclose: A digital camera having a focusing function and a focal length varying function of a main lens, the digital camera comprising:

A magnification setting unit configured to set a level of magnification on the basis of the focal length and wherein the magnification setting unit is configured to set the level of the magnification in order to match substantially a size of the main image and a size of the sub-image.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SELAM GEBRIEL whose telephone number is (571)270-1652. The examiner can normally be reached on 8:00 AM - 5:00

Art Unit: 2661

PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571)272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TUAN HO/
Primary Examiner, Art Unit 2661

**/SELAM GEBRIEL/
Examiner, Art Unit 2661**

Notice of References Cited	Application/Control No. 12/976,048		Applicant(s)/Patent Under Reexamination SHIOHARA, RYUICHI	
	Examiner SELAM GEBRIEL		Art Unit 2661	Page 1 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,226,459 B1	05-2001	Hamada et al.	396/54
*	B	US-6,433,824 B1	08-2002	Tanaka et al.	348/345
*	C	US-6,731,339 B2	05-2004	Ohkawara, Hiroto	348/347
*	D	US-6,757,013 B2	06-2004	Matsuzaka, Kazuhiro	348/240.1
*	E	US-6,839,086 B1	01-2005	Katagiri, Yoshito	348/347
*	F	US-7,289,152 B2	10-2007	Watanabe et al.	348/357
*	G	US-7,305,180 B2	12-2007	Labaziewicz et al.	396/60
*	H	US-7,509,041 B2	03-2009	Hosono, Eiji	396/60
*	I	US-7,676,146 B2	03-2010	Border et al.	396/80
*	J	US-7,680,411 B2	03-2010	Ye, Zhijin	396/334
*	K	US-7,738,016 B2	06-2010	Toyofuku, Toshiyuki	348/240.1
*	L	US-7,856,181 B2	12-2010	Maazono, Nobuyoshi	396/324
*	M	US-7,884,862 B2	02-2011	Ishii et al.	348/240.3

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Notice of References Cited	Application/Control No. 12/976,048	Applicant(s)/Patent Under Reexamination SHIOHARA, RYUICHI	
	Examiner SELAM GEBRIEL	Art Unit 2661	Page 2 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-8,035,725 B2	10-2011	Chen et al.	348/349
*	B	US-8,089,527 B2	01-2012	Tomita, Hiroki	348/222.1
*	C	US-8,194,168 B2	06-2012	Mowry, Craig	348/335
*	D	US-8,363,126 B2	01-2013	Kurokawa, Tomoyasu	348/240.3
*	E	US-2008/0030592	02-2008	Border et al.	348/218.1
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	113	((RYUICHI) near2 (SHIOHARA)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/21 18:15
S2	419772	(SEIKO or EPSON).as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/21 18:16
S3	419776	S1 or S2	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/21 18:16
S4	11	S3 and (vary\$3 or variable) with focus\$4 same (focus\$4 or focal)near3 length	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/21 18:17
S5	1	S4 and 29a	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/21 18:21
S6	3630	348/345-357.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/21 18:22
S7	0	S6 and roller near3 position same (distance or displacement) near ring	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/21 18:23
S8	0	S6 and roller near3 position and (distance or displacement) near ring	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	ADJ	ON	2013/02/21 18:24

			DERWENT; IBM_TDB			
S9	210	roller near3 position and (distance or displacement) near ring	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/21 18:24
S10	8	roller near3 position and (distance or displacement) near ring and focus\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/21 18:24
S11	113	S6 and (vary\$3 or variable) with (lenslet or optic or optical or focus\$4 or lens) same (focus\$4 or focal)near3 length same (magnify\$4 or magnification)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/21 18:28
S12	59	S6 and (vary\$3 or variable) with (lenslet or optic or optical or focus\$4 or lens) same (focus\$4 or focal)near3 length same (magnify\$4 or magnification) and ((first or main)and (second or sub)) near3 (imaging or image sens\$4 or image)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/21 18:29
S13	33	("20030020814" "20030160886" "20050134709" "20050145772" "20060092505" "20060187312" "20070064141" "20070064142" "20080030592" "20080084484" "20080158346" "20080158384" "20080218613" "20090153649" "4231647" "5682198").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/21 18:53
S14	113	((RYUICHI) near2 (SHIOHARA)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 11:31
S15	419772	(SEIKO or EPSON).as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/22 11:31
S16	419776	S14 or S15	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/22 11:31
S17	49	S16 and (vary\$3 or variable) with (focus\$4 or lens) same (focus\$4 or focal)near3 length	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	ADJ	ON	2013/02/22 11:31

			IBM_TDB			
S18	386	measur\$4 near3 (converg\$3 or diverg\$3) near3 light same (lens or optical or lenslet or optic)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/22 11:34
S19	29	measur\$4 near3 (converg\$3 or diverg\$3) near3 light same (lens or optical or lenslet or optic) and ("348".clas. or "396".clas. or "359".clas.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/22 11:34
S20	275	(Wide angle lens and (telescopic or tele))near3 lens	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/22 11:38
S21	8	(Wide angle lens and (telescopic or tele))near3 (imaging or sensor or image sens\$4 or image pickup or CCD or CMOS)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/22 11:39
S22	459	396/72.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/22 11:49
S23	75	focal length with magnification and S22	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/22 11:52
S24	3	(composit\$4 or combin\$4 or syntesiz\$4)near3 image and S23	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/22 11:54
S25	238	(composit\$4 or combin\$4 or syntesiz\$4)near3 image and 348/240\$.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/22 11:55
S26	6	(composit\$4 or combin\$4 or syntesiz\$4)near3 ((first or main) and (second or sub))image and 348/240\$.ccls.	US-PGPUB; USPAT; USOCR; FPRS;	ADJ	ON	2013/02/22 11:55

			EPO; JPO; DERWENT; IBM_TDB			
S27	6	(composit\$4 or combin\$4 or syntesiz\$4)near3 ((first or main or wide) and (second or sub or tele))image and 348/240.\$ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/22 11:56
S28	8	("20080218612" "20090128644" "20020195548" "20080030592").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/22 12:02
S29	3	"20070120988"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/22 12:02
S30	451	348/262-263.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/22 12:08
S32	1243	348/240.\$ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/22 12:09
S33	36	("20020163582" "20030020814" "20030160886" "20030202113" "3497614" "4097882" "4199785" "4989078" "5051830" "5164831" "5668597" "5929903" "6288742" "6611289" "6804460").PN. OR ("7206136").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 12:22
S34	1	12/976048	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 12:34
S35	1	"12976048" and focal length near3 main len	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:03
S36	1	"12976048" and focal length near3 main lens	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:03
S37	438	348/240.3.ccls.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:23
S38	11	348/240.3.ccls. and focal length with magnification and fixed near3 focal length	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:23

S39	19	("5140360" "5369461" "5587842" "5612737" "5752098" "5812189" "6204880" "6271974" "6301439" "6396645").PN. OR ("6839086").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:27
S40	114	348/240.3.ccls. and focal length with magnification	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:30
S41	96	348/240.3.ccls. and (focal length and magnification and zoom\$4) and (composit\$4 or combin\$3 or superimpos\$3 or mix\$3 or blend\$3 or syntesis\$4 or syntesis\$3)	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:31
S42	10	348/240.3.ccls. and (focal length and magnification and zoom\$4) and (composit\$4 or combin\$3 or superimpos\$3 or mix\$3 or blend\$3 or syntesis\$4 or syntesis\$3)near (image or picture or scene)	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:32
S43	11	348/240.3.ccls. and (focal length and magnification) and (composit\$4 or combin\$3 or superimpos\$3 or mix\$3 or blend\$3 or syntesis\$4 or syntesis\$3)near (image or picture or scene)	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:34
S44	1	S43 not S42	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:34
S45	57	"348".clas. and ((focal or focus\$4) length and magnification) same (composit\$4 or combin\$3 or superimpos\$3 or mix\$3 or blend\$3 or syntesis\$4 or syntesis\$3)near (image or picture or scene)	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:37
S46	11	("20040087773" "20020075258" "20030202113" "5668597" "6078701" "5164831" "5436660" "5657402" "20030227556" "20040017386" "6549215").PN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:49
S47	1659	(348/240.\$ccls. or 396/72.ccls.)	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:54
S48	3621	348/345-357.ccls.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:55
S49	184	S47 and S48	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:55
S50	32	(348/240.\$ccls. and 396/72.ccls.)	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:55
S51	2	S50 and S48	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 16:55
S52	5	("20030020814" "5822625" "6757013").PN. OR ("7738016").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 17:00
S53	48	("20010013902" "20010040630" "20020154912" "20030016942" "20030160886" "20040174444"	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 17:04

		"20050134709" "20070046804" "20070053068" "20070296837" "20080129857" "20080211935" "20080239104" "20090153649" "20090167897" "20090167898" "20090167899" "20090290046" "20100013960" "20100079623" "20100103291" "20100149378" "20100157103" "20110013049" "20110043662" "20110109771" "5398062" "5557328" "5754230" "5867217" "6819357" "6850700" "7053953" "7057651" "7154544" "7221395" "7305180" "7319811" "7327890" "7362966" "7453506" "7511745" "7710468" "7711258" "7738016" "7848575" "7907189" "7936383").PN. OR ("8363126").URPN.				
S54	4	("20070065127" "20110304765" "20120147150" "8184197").PN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 17:30
S55	1	"12976048"	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/22 17:41
S56	18	(US-20100110236-\$ or US- 20080025713-\$ or US-20070236597-\$ or US-20020067421-\$ or US- 20120026366-\$ or US-20060187312-\$ or US-20100238327-\$ or US- 20100079623-\$ or US-20030020814-\$ or US-20110109771-\$).did. or (US- 6839086-\$ or US-6731339-\$ or US- 6433824-\$ or US-8089527-\$ or US- 7856181-\$ or US-7509041-\$ or US- 7305180-\$ or US-6757013-\$).did.	US-PGPUB; USPAT	ADJ	ON	2013/02/23 19:06
S57	2042	focus\$4 near3 ring and (focal or focus)near3 length	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 19:11
S58	10261	(VArY\$4 or variable or var\$3)near5 (Focus or focal)length	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 19:17
S59	74798	(fixed or pan-focus)near2 (lens or optical)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 19:17
S60	11959	magnificat\$4 with (focal length or focus\$4)near3 (length)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	ADJ	ON	2013/02/23 19:18

			IBM_TDB			
S61	926	S58 and S59 and S60	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 19:18
S62	14555	magnification with image with size	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 19:19
S63	176	S62 and S61	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 19:19
S64	1243	348/240\$.ccls. or "396""."72".ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 19:19
S65	167	S64 and 348/345-357.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 19:19
S66	1	S65 and S63	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 19:19
S67	527547	(composit\$4 or combin\$4 or syntesis\$4 or syntesiz\$4 or blend\$4 or mix\$4 or adding or superimpose)near2 (scene or image or signal or pitcure)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 19:21
S68	539794	(composit\$4 or combin\$4 or syntesis\$4 or syntesiz\$4 or blend\$4 or mix\$4 or adding or superimpose)near2 (scene or image or signal or picture)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 19:21
S69	18	S68 and S63	US-PGPUB; USPAT; USOCR; FPRS;	ADJ	ON	2013/02/23 19:22

			EPO; JPO; DERWENT; IBM_TDB			
S70	479	(zoom\$4 and (fixed or variable))(lens or optical or lenslet or optics)and(composit\$4 or combin\$4 or syntesis\$4 or syntesiz\$4 or blend\$4 or mix\$4 or adding or superimpose)near2 (scene or image or signal or picture)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 19:29
S71	0	S70 and 359/354.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 19:29
S72	104	359/354.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 19:30
S73	16	(zoom\$4 and (fixed or variable))(lens or optical or lenslet or optics)and(composit\$4 or combin\$4 or syntesis\$4 or syntesiz\$4 or blend\$4 or mix\$4 or adding or superimpose)near2 (scene or image or signal or picture) and 348/240.\$ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 19:31
S74	3668	(acquir\$4 or determin\$4 or calculat\$4)near3 (focus\$4 or focal)near2 length with (lens)	US-PGPUB; USPAT	ADJ	ON	2013/02/23 19:48
S75	2	"20080084484"	US-PGPUB; USPAT	ADJ	ON	2013/02/23 19:49
S76	1	"12976048"	US-PGPUB; USPAT	ADJ	ON	2013/02/23 19:53
S77	0	focal length near5 select\$4 near5 focal point same (combin\$4 or composit\$4)image	US-PGPUB; USPAT	ADJ	ON	2013/02/23 19:56
S78	0	focal length near5 select\$4 near5 focal point same (combin\$4 or composit\$4)image	US-PGPUB; USPAT	ADJ	ON	2013/02/23 19:56
S79	1	focal length near5 select\$4 near5 focal point and (combin\$4 or composit\$4)image	US-PGPUB; USPAT	ADJ	ON	2013/02/23 19:56
S80	187	focal length near5 select\$4 near5 focal and (combin\$4 or composit\$4)image	US-PGPUB; USPAT	ADJ	ON	2013/02/23 19:56
S81	67	focal length near5 select\$4 near5 focal and (combin\$4 or composit\$4)image and (first and second)(image or imaging or CCD or CMOS)	US-PGPUB; USPAT	ADJ	ON	2013/02/23 19:57
S82	1	"20110157404" and focal length	US-PGPUB; USPAT	ADJ	ON	2013/02/23 20:18
S83	1	cutout with magnification and focal length near4 lever	US-PGPUB; USPAT	ADJ	ON	2013/02/23 20:22
S84	1	cutout same magnification same focal	US-PGPUB;	ADJ	ON	2013/02/23

		length near4 (inputed or select\$4)	USPAT			20:25
S85	4	cutout same magnification same focal length	US-PGPUB; USPAT	ADJ	ON	2013/02/23 20:25
S86	0	(viewfinder or finder or view-finder or view finder)adj2 imagesame focal length	US-PGPUB; USPAT	ADJ	ON	2013/02/23 20:26
S87	198	(viewfinder or finder or view-finder or view finder)adj2 image same focal length	US-PGPUB; USPAT	ADJ	ON	2013/02/23 20:26
S88	106	(viewfinder or finder or view-finder or view finder)adj2 image same focal length and magnification	US-PGPUB; USPAT	ADJ	ON	2013/02/23 20:27
S89	3590	S88 and 348/240.\$\$.ccls or 348/345-357.ccls.	US-PGPUB; USPAT	ADJ	ON	2013/02/23 20:27
S90	5	S88 and (348/240.\$\$.ccls or 348/345-357.ccls.)	US-PGPUB; USPAT	ADJ	ON	2013/02/23 20:27
S91	6003	((focal length and (magnification or magnified) and ((composit\$4 or combin\$4 or syntesis\$4 or syntesiz\$4 or blend\$4 or mix\$4 or adding or superimpose)near2 (scene or image or signal or picture)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 20:29
S92	99	((focal length and (magnification or magnified) and ((composit\$4 or combin\$4 or syntesis\$4 or syntesiz\$4 or blend\$4 or mix\$4 or adding or superimpose)near2 (scene or image or signal or picture))))).dm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 20:29
S93	91	S92 and @ad<="20091225"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/23 20:30
S94	8	("2005/0270387").URPN.	USPAT	ADJ	ON	2013/02/23 20:44
S95	8	("2005/0270387").URPN.	USPAT	ADJ	ON	2013/02/24 20:44
S96	7	("20020176712" "20030020814" "20050270387" "4255033" "4541007" "5361108").PN. OR ("7680411").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/24 20:46
S97	7	("20020176712" "20030020814" "20050270387" "4255033" "4541007" "5361108").PN. OR ("7680411").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/24 20:49
S98	1	"12976048"	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/24 21:01
S99	11936	magnification with (focus or focal)near2 length	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	ADJ	ON	2013/02/24 21:23

			IBM_TDB			
S100	159	S99 and 348/345.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/24 21:23
S101	31	S99 and 348/345.ccls. and (composit\$4 or combin\$4 or syntesis\$4 or syntesiz\$4 or blend\$4 or mix\$4 or adding or superimpose)near2 (scene or image or signal or picture)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/24 21:24
S102	0	S99 and 348/345.ccls. and (composit\$4 or combin\$4 or syntesis\$4 or syntesiz\$4 or blend\$4 or mix\$4 or adding or superimpose)near2 (scene or image or signal or picture) abd @ad<="20091225"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/24 21:24
S103	26	S99 and 348/345.ccls. and (composit\$4 or combin\$4 or syntesis\$4 or syntesiz\$4 or blend\$4 or mix\$4 or adding or superimpose)near2 (scene or image or signal or picture) and @ad<="20091225"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/24 21:24
S104	111	(zoom\$4 or magnif\$7) with (focal or focus)(length or distance) and (348/240.\$ccls. and (348/345-357.ccls. or 396/72.ccls.))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/24 21:33
S105	50	(zoom\$4 or magnif\$7) with (focal or focus)(length or distance) and (348/240.\$ccls. and (348/345-357.ccls. or 396/72.ccls.)) and size near4 image	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/24 21:33
S106	44	S105 and @ad<="20091225"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/24 21:34
S107	111	(zoom\$4 or magnif\$7) with (focal or focus)(length or distance) and (348/240.\$ccls. and (348/345-357.ccls. or 396/72.ccls.))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/24 21:47
S108	97	(zoom\$4 or magnif\$7) with (focal or focus)(length or distance) and (348/240.\$ccls. and (348/345-357.ccls. or 396/72.ccls.)) and	US-PGPUB; USPAT; USOCR; FPRS;	ADJ	ON	2013/02/24 21:47

		@ad< = "20091225"	EPO; JPO; DERWENT; IBM_TDB			
S109	53	S108 NOT S106	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/24 21:47
S110	5	("20030020814" "5822625" "6757013").PN. OR ("7738016").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/24 21:53
S111	16	("20030020814" "20030160886" "20050134709" "20050145772" "20060092505" "20060187312" "20070064141" "20070064142" "20080030592" "20080084484" "20080158346" "20080158384" "20080218613" "20090153649" "4231647" "5682198").PN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/24 21:58
S112	1	348/42.ccls. and 348/345-357.ccls. and (348/240.\$ccls. or 396/72.ccls.)	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/24 22:14
S113	2	"20080084484" and (composit\$4 or combin\$4)	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/25 09:42
S114	1	"20080030592"	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/25 09:53
S115	1	"20080030592" and focal length	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/25 10:08
S116	1	"20080030592" and focal length	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/25 11:12
S117	1	"20080030592" and focus\$4	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/25 11:27
S119	0	principle of triangulation	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/25 11:33
S120	2653	principle near3 triangulation	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/25 11:33
S121	33	("20030020814" "20030160886" "20050134709" "20050145772" "20060092505" "20060187312" "20070064141" "20070064142" "20080030592" "20080084484" "20080158346" "20080158384" "20080218613" "20090153649" "4231647" "5682198").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/02/25 11:39
S122	32	(US-20100110236-\$ or US- 20080025713-\$ or US-20070236597-\$ or US-20020067421-\$ or US- 20120026366-\$ or US-20060187312-\$ or US-20100238327-\$ or US- 20100079623-\$ or US-20030020814-\$	US-PGPUB; USPAT	ADJ	ON	2013/02/25 11:39

		or US-20110109771-\$ or US-20110242369-\$ or US-20080219654-\$ or US-20080030592-\$ or US-20050270387-\$ or US-20030160886-\$).did. or (US-6839086-\$ or US-6731339-\$ or US-6433824-\$ or US-8089527-\$ or US-7856181-\$ or US-7509041-\$ or US-7305180-\$ or US-6757013-\$ or US-6226459-\$ or US-7676146-\$ or US-8194168-\$ or US-8035725-\$ or US-7680411-\$ or US-7884862-\$ or US-7289152-\$ or US-7738016-\$ or US-8363126-\$).did.				
S123	28	S122 NOT S121	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/25 11:39
S124	1	"20080030592" and distance	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/02/25 11:45

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	9	(focal length near5 magnifica\$4 and (combin\$4 or composi\$4)image).clm.	US-PGPUB; USPAT; UPAD	ADJ	ON	2013/02/28 13:23

2/ 28/ 2013 1:34:49 PM**C:\ Users\ sgebriel\ Documents\ EAST\ Workspaces\ Application_12976048new2.wsp**

Issue Classification 	Application/Control No. 12976048	Applicant(s)/Patent Under Reexamination SHIOHARA, RYUICHI
	Examiner SELAM GEBRIEL	Art Unit 2661

CPC		
Symbol	Type	Version

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

US ORIGINAL CLASSIFICATION						INTERNATIONAL CLASSIFICATION													
CLASS		SUBCLASS				CLAIMED					NON-CLAIMED								
348		240.99				H	0	4	N	5 / 262 (2006.01.01)									
CROSS REFERENCE(S)						G	0	3	B	17 / 00 (2006.0)									
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																		
348	240.3																		
396	72																		

/SELAM GEBRIEL/ Examiner, Art Unit 2661 (Assistant Examiner)	02/28/2013 (Date)	Total Claims Allowed: 6	
/TUAN HO/ Primary Examiner, Art Unit 2661 (Primary Examiner)	(Date)	O.G. Print Claim(s) 1	O.G. Print Figure 7

Issue Classification 	Application/Control No. 12976048	Applicant(s)/Patent Under Reexamination SHIOHARA, RYUICHI
	Examiner SELAM GEBRIEL	Art Unit 2661

/SELAM GEBRIEL/ Examiner, Art Unit 2661 (Assistant Examiner)	02/28/2013 (Date)	Total Claims Allowed: 6	
/TUAN HO/ Primary Examiner, Art Unit 2661 (Primary Examiner)	 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 7

Issue Classification 	Application/Control No. 12976048	Applicant(s)/Patent Under Reexamination SHIOHARA, RYUICHI
	Examiner SELAM GEBRIEL	Art Unit 2661

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1														
	2														
2	3														
3	4														
4	5														
5	6														
6	7														

/SELAM GEBRIEL/ Examiner, Art Unit 2661 (Assistant Examiner)	02/28/2013 (Date)	Total Claims Allowed: 6	
/TUAN HO/ Primary Examiner, Art Unit 2661 (Primary Examiner)	 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 7

<i>Index of Claims</i> 	Application/Control No. 12976048	Applicant(s)/Patent Under Reexamination SHIOHARA, RYUICHI
	Examiner SELAM GEBRIEL	Art Unit 2661

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant				☐ CPA				☐ T.D.				☐ R.1.47			
CLAIM		DATE													
Final	Original	06/17/2012	02/25/2013												
1	1	✓	=												
	2	✓	-												
2	3	✓	=												
3	4	✓	=												
4	5	✓	=												
5	6	✓	=												
6			=												

Search Notes 	Application/Control No. 12976048	Applicant(s)/Patent Under Reexamination SHIOHARA, RYUICHI
	Examiner SELAM GEBRIEL	Art Unit 2622

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
348	345-356,42,47,48,51,333.01	6/17/2012	S.G.
348	240.1,240.99,240.2,240.3	2/25/2013	S.G.

SEARCH NOTES		
Search Notes	Date	Examiner
Inventership Search Is Performed	6/17/2012	S.G.
See East Search History For Text Search	2/25/2013	S.G.
Consulted Tuan Ho For Allowance	2/28/2013	S.G.

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

/SELAM GEBRIEL/ Examiner.Art Unit 2622	02/25/2013
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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/976,048	12/22/2010	2661	1090	SE-US105228	6	1

CONFIRMATION NO. 6698

CORRECTED FILING RECEIPT



OC000000060044629

22919
GLOBAL IP COUNSELORS, LLP
1233 20TH STREET, NW, SUITE 700
WASHINGTON, DC 20036-2680

Date Mailed: 03/25/2013

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Ryuichi SHIOHARA, Matsumoto, JAPAN;

Applicant(s)

Ryuichi SHIOHARA, Matsumoto, JAPAN;

Assignment For Published Patent Application

SEIKO EPSON CORPORATION, Tokyo, JAPAN

Power of Attorney: The patent practitioners associated with Customer Number 22919

Domestic Applications for which benefit is claimed - None.

A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.)

JAPAN 2009-295202 12/25/2009

Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper **Request to Retrieve Electronic Priority Application(s)** (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

If Required, Foreign Filing License Granted: 01/06/2011

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/976,048**

Projected Publication Date: Not Applicable

page 1 of 3

Non-Publication Request: No

Early Publication Request: No
Title

DIGITAL CAMERA GENERATING COMPOSITE IMAGE FROM MAIN IMAGE AND SUB-IMAGE,
AND METHOD FOR MANUFACTURING SAME

Preliminary Class

348

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

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The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

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NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/976,048	12/22/2010	Ryuichi SHIOHARA	SE-US105228	6698

22919	7590	04/02/2013
GLOBAL IP COUNSELORS, LLP		
1233 20TH STREET, NW, SUITE 700		
WASHINGTON, DC 20036-2680		

EXAMINER	
GEBRIEL, SELAM T	

ART UNIT	PAPER NUMBER
2661	

NOTIFICATION DATE	DELIVERY MODE
04/02/2013	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailpto@giplaw.com

Notice of Allowability	Application No.	Applicant(s)	
	12/976,048	SHIOHARA, RYUICHI	
	Examiner	Art Unit	
	SELAM GEBRIEL	2661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to interview on 2/28/2013.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1 and 3-7(Now Renumered From 1-6). As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☒ All b) ☐ Some* c) ☐ None of the:

1. ☒ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. ____.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)	5. ☒ Examiner's Amendment/Comment
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date ____	6. ☒ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material	7. ☒ Other <u>XRUSH Response</u> .
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date ____.	

/SELAM GEBRIEL/ Examiner, Art Unit 2661	
--	--

DETAILED ACTION

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Akiyoshi Onda on 02/28/2013.

Amendment

Cancel claim 2

Claim 1. A digital camera having a focusing function and a focal length varying function of a main lens, the digital camera comprising:

a main imaging unit configured to generate a main image by performing a photoelectric conversion from a subject obtained via the main lens;

a sub-imaging unit configured to generate a sub-image by performing a photoelectric conversion from the subject obtained via a sub-lens;

a focal length acquiring unit configured to acquire the focal length of the main lens;

a magnification setting unit configured to set a level of magnification on the basis of the focal length;

a composite image generating unit configured to generate a composite image by combining the main image and the sub-image, after at least one of the main image and the sub-image is magnified at the level of magnification; ~~and~~

an image display unit configured to display the composite image- ; and
wherein the magnification setting unit is configured to set the level of the magnification in order to match substantially a size of the main image and a size of the sub-image.

Claim 3. In line 1 delete "2" and replace with "1"

Claim 4. In line 1 delete "2" and replace with "1"

Allowable Subject Matter

Claims 1 and 3 – 7 are allowed.

Reason for Allowance

The following is an examiner's statement of reasons for allowance:

Regarding claim 1: The prior art of alone or in combination does not disclose: A digital camera having a focusing function and a focal length varying function of a main lens, the digital camera comprising:

A magnification setting unit configured to set a level of magnification on the basis of the focal length and wherein the magnification setting unit is configured to set the level of the magnification in order to match substantially a size of the main image and a size of the sub-image.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SELAM GEBRIEL whose telephone number is (571)270-1652. The examiner can normally be reached on 8:00 AM - 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571)272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

**/SELAM GEBRIEL/
Examiner, Art Unit 2661**

**/Sinh Tran/
Supervisory Patent Examiner, Art Unit 2661**

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

22919 7590 03/07/2013
 GLOBAL IP COUNSELORS, LLP
 1233 TWENTIETH STREET, NW, SUITE 700
 WASHINGTON, DC 20036

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/976,048	12/22/2010	Ryuichi SHIOHARA	SE-US105228	6698

TITLE OF INVENTION:

DIGITAL CAMERA GENERATING COMPOSITE IMAGE FROM MAIN IMAGE AND SUB-IMAGE, AND METHOD FOR MANUFACTURING SAME

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1780	\$300	\$0	\$2080	06/07/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
GEBRIEL, SELAM T	2661	348-345000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Global IP Counselors, LLP

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.111. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

Seiko Epson Corporation

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Tokyo, Japan

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 50-1836 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /Akiyoshi Onda/

Date June 6, 2013

Typed or printed name Akiyoshi Onda

Registration No. 63,773

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Electronic Patent Application Fee Transmittal				
Application Number:		12976048		
Filing Date:		22-Dec-2010		
Title of Invention:		DIGITAL CAMERA GENERATING COMPOSITE IMAGE FROM MAIN IMAGE AND SUB-IMAGE, AND METHOD FOR MANUFACTURING SAME		
First Named Inventor/Applicant Name:		Ryuichi SHIOHARA		
Filer:		David L. Tarnoff/Megumi McKeever		
Attorney Docket Number:		SE-US105228		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	1501	1	1780	1780
Publ. Fee- Early, Voluntary, or Normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2080

Electronic Acknowledgement Receipt	
EFS ID:	15971624
Application Number:	12976048
International Application Number:	
Confirmation Number:	6698
Title of Invention:	DIGITAL CAMERA GENERATING COMPOSITE IMAGE FROM MAIN IMAGE AND SUB-IMAGE, AND METHOD FOR MANUFACTURING SAME
First Named Inventor/Applicant Name:	Ryuichi SHIOHARA
Customer Number:	22919
Filer:	David L. Tarnoff/Megumi McKeever
Filer Authorized By:	David L. Tarnoff
Attorney Docket Number:	SE-US105228
Receipt Date:	06-JUN-2013
Filing Date:	22-DEC-2010
Time Stamp:	16:49:42
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$2080
RAM confirmation Number	3961
Deposit Account	501836
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The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	SE-US105228_IF.pdf	113180	no	1
			d33a03f8665070d48c78ff55a078f6e3c41b285a		

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	32263	no	2
			0d6c5161c6b0d1744a57f732b3397058822a833f		

Warnings:

Information:

Total Files Size (in bytes):			145443
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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

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New International Application Filed with the USPTO as a Receiving Office

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/976,048	07/09/2013	8482638	SE-US105228	6698

22919 7590 06/19/2013
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ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 161 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Ryuichi SHIOHARA, Matsumoto, JAPAN;

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