PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

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PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)* 27 DEC 2018

Applicant's or agent's file reference	FOR FURTHER ACTION
151958WO01	See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2018/053446	28 September 2018	29 September 2017

International Patent Classification (IPC) or both national classification and IPC
IPC(8) - G02B 15/14; G02B 3/02; G02B 15/15; G02B 15/163; G02B 15/22 (2018.01)
CPC - G02B 15/14; G02B 3/02; G02B 15/15; G02B 15/163; G02B 15/22 (2018.08)

Applicant SYMBOL TECHNOLOGIES, LLC

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/US	Date of completion of this opinion	Authorized officer
Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, VA 22313-1450 Facsimile No. 571-273-8300	12 December 2018	Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

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Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a)).

3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:

   a. ☐ forming part of the international application as filed:

      ☐ in the form of an Annex C/ST.25 text file.

      ☐ on paper or in the form of an image file.

   b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.

   c. ☐ furnished subsequent to the international filing date for the purposes of international search only:

      ☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).

      ☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

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Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-22	YES
	Claims	None	NO
Inventive step (IS)	Claims	None	YES
	Claims	1-22	NO
Industrial applicability (IA)	Claims	1-22	YES
	Claims	None	NO

2. Citations and explanations:

Claims 1-3, 5-8, 20, and 21 lack an inventive step under PCT Article 33(3) as being obvious over Konica Minolta in view of Roustaei et al. (hereinafter Roustaei).

Regarding claim 1, Konica Minolta discloses an imaging assembly for capturing an image of at least one object appearing in a field of view (FOV) (abstract, page 1, para. 1, 2, page 6, para. 6, para. 7, paras. 1-7), the imaging assembly comprising:
a housing (page 7, para. 7, Fig. 1, discussing a zoom lens 10 held in a housing [not shown]);
an image sensor fixedly mounted relative to the housing (page 7, para. 1-7, discussing imaging device camera module 50 having a zoom lens 10 and forming an object image on an image pick-up element 51 [image sensor], all within the lens barrel 54 [wherein the lens barrel is within the housing, not shown]; page 8, para. 2, 6, wherein the lens groups 1, 3, and 5 are fixed with reference to imaging surface [image sensor] 51);
a base lens assembly fixedly mounted relative to the housing (page 7, paras. 1-7, page 8, para. 2, Fig. 1, discussing lens assemblies, group 3 and 5 [base lenses]; page 8, para. 2, 6, wherein the lens groups 1, 3, and 5 are fixed with reference to imaging surface [image sensor] 51); and
a moveable lens movably mounted relative to the housing (page 7, paras. 1-7, page 8, para. 2, Fig. 1, discussing movable lens assemblies groups 2, 4, wherein the movable lens assemblies have a drive mechanism 55a which may be a voice coil type mechanism; see Figs. 7A-C, illustrating Groups 1 and 2 moving relative to housing [not shown] while base lens groups 3 and 5 remain stationary), wherein:
the moveable lens, the base lens assembly, and the image sensor are aligned such that light received within the FOV passes through the moveable lens and the base lens assembly, and impinges onto the image sensor (page 7, paras. 1-7, page 8, paras. 1, 2, Fig. 1, discussing the light path through the camera module is from the object OP through prism PRM, wherein the light is redirected through aligned [along AX1] moving lens group 2, then through base lens group 3, and impinges on image sensor 51);
prior to entering any one of the moveable lens and the base lens assembly, the light received from the FOV forms an original image (see Fig. 1, wherein light enters the prism PRM [having an axis AX2], such that the object forms an "original" image when the light first enters the zoom lens, prior to being reflected along axis AX1 through the moving and base lens groups; page 6, para. 6, discussing a wide angle view and a telephoto view [interpreted as fields of view]);
the light received from the FOV that impinges onto the image sensor forms an impinging image (page 7, para. 2, Fig. 1, discussing the imaging surface of the object on the image surface 51 forming an image I [impinging image]); and at least one of the moveable lens and the base lens assembly is operable to simultaneously magnify at a first magnification value (page 7, para. 7, page 9, para. 3, page 10, para. 9-10, Fig. 1, discussing the zoom lens 10 includes a focusing magnification mechanism in magnification lens group 2 [a first moving lens group] for magnifying a lateral portion of the image ["lateral magnification"]) such that a first part of the impinging image is magnified at the first magnification value relative to the original image (page 7, para. 7, page 9, para. 3, page 10, para. 9-10, Fig. 1, discussing the zoom lens 10 includes a focusing magnification mechanism in magnification lens group 2 [a first moving lens group] for magnifying a lateral portion of the image ["lateral magnification" of the image]).
Konica Minolta fails to explicitly disclose to simultaneously magnify at a first magnification value and magnify at a second magnification value such that a second part of the impinging image is magnified at the second magnification value relative to the original image.
Roustaei, however, discusses a bar code scanner having magnification means (abstract), and teaches to simultaneously magnify at a first magnification value and a magnify at a second magnification value such that a second part of an impinging image is magnified at a second magnification value relative to the original image (in a variation of the invention, a lens includes portions having different focal lengths, see, col. 24, line 65 to col. 25, line 7 and Fig. 15, discussing the lens with a double radius creates, in effect, two separate cylindrical sub-lenses 96 and 98, each with a different focal length. The light emitted by the LEDs will be focussed by both sub-lenses 96 and 98 so that two different lines of focussed light are created [thus light detected from each of the focus lines will be at a different magnification at different parts on the detector]).
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta with the teaching of Roustaei for the purpose of providing greater variability in the distance at which a bar code can be accurately read without requiring a change in the cylindrical lens or a compromise in the strength of the signal (Roustaei, col. 24, line 65 to col. 25, line 7).

Regarding Claim 2, modified Konica Minolta discloses the imaging assembly of claim 1, wherein the base lens assembly is positioned between the moveable lens and the image sensor (see Fig. 1, wherein lens groups 3 and 5 are between the moveable lens group 2 and the image sensor 51).

Regarding claim 3, Konica Minolta discloses the imaging assembly of claim 1, wherein the moveable lens is moveable via a voice coil motor (page 7, paras. 1-7, page 8, para. 2, Fig. 1, discussing movable lens assemblies groups 2, 4, wherein the movable lens assemblies have a drive mechanism 55a which may be a voice coil type mechanism).

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 19 and 22 are objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claims 19 and 22 are indefinite for the following reason:
Claim 19 depends from claim 14 and recites "the second part of the impinging image", "the second magnification value", and "the first magnification value". However, claim 14 lacks antecedent basis for "the second part of the impinging image", "the second magnification value", and "the first magnification value" recited.
For the purpose of the international opinion, claim 19 as best understood is interpreted as depending from claim 15, which provides proper antecedent basis for "the second part of the impinging image", "the second magnification value", and "the first magnification value" recited.
Claim 22 recites "the voice coil motor", which lacks antecedent basis.
For the purpose of the international opinion, claim 22 as best understood is interpreted as reciting "a voice coil motor".

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

Regarding claim 5, Konica Minolta discloses the imaging assembly of claim 1, wherein the base lens assembly includes a base lens (page 7, paras. 1-7, page 8, para. 2, Fig. 1, discussing lens assemblies, group 3 and 5 [base lenses] having a first side and a second side (page 8, paras. 1-2, discussing the lens groups have an object side [first side] of the lens and an image side [second side]), the light received from the FOV -passing through the first side and further through the second side(page 8, paras. 1-2, discussing the lens groups have an object side [first side] of the lens and an image side [second side]; see Fig. 1, illustrating the light entering through the OP and to the prism prm, and then along axis AX1, through the object side [first side] then through image side [second side] of the base lens Group 3), and wherein at least a portion of the second side is concave and convex (page 8, para 1, wherein the image side of the group 3 have both convex and concave surface [see L32, L33]).
The first embodiment of Konica Minolta fails to explicitly disclose wherein at least a portion of the first side is concave. However, a second embodiment of Konica Minolta in Fig. 15A-D teaches an object side of the base lens group 3 can be concave (page 15, para. 6, Figs. 15A-D, wherein group 3 lens include a concave object side of base lens L32 and concave image side of L32). It would have been obvious to one of ordinary skill in the art to modify the first embodiment of Konica Minolta [Fig. 1] and modify the lens surface as taught by the second embodiment [Fig. 15A-D] of Konica Minolta. The motivation to do so would have been to design a lens system with a desired focal length and magnification range, thereby controlling aberrations, astigmatism, and distortion aberrations in the final image (Konica Minolta, page. 6, para. 1).

Regarding claim 6, Konica Minolta discloses the imaging assembly of claim 1, wherein the base lens assembly includes a base lens (page 7, paras. 1-7, page 8, para. 2, Fig. 1, discussing lens assemblies, group 3 and 5 [base lenses]) having a first side and a second side (page 8, paras. 1-2, discussing the lens groups have an object side [first side] of the lens and an image side [second side]), the light received from the FOV -passing through the first side and further through the second side(page 8, paras. 1-2, discussing the lens groups have an object side [first side] of the lens and an image side [second side]; see Fig. 1, illustrating the light entering through the OP and to the prism prm, and then along axis AX1, through the object side [first side] then through image side [second side] of the base lens Group 3), wherein at least a portion of the first side is convex (page 8, para. 1, Fig. 1, wherein the object side of lens group 3, L31 and L32 are convex), and wherein at least a portion of the second side is concave and convex (page 8, para 1, wherein the image side of the group 3 have both convex and concave surface [see L32, L33]).
The first embodiment of Konica Minolta fails to explicitly disclose wherein at least a portion of the first side is concave. However, a second embodiment of Konica Minolta in Fig. 15A-D teaches an object side of the base lens group 3 can be concave (page 15, para. 6, Figs. 15A-D, wherein group 3 lens include a concave object side of base lens L32 and concave image side of L32). It would have been obvious to one of ordinary skill in the art to modify the first embodiment of Konica Minolta [Fig. 1] and modify the lens surface as taught by the second embodiment [Fig. 15A-D] of Konica Minolta. The motivation to do so would have been to design a lens system with a desired focal length and magnification range, thereby controlling aberrations, astigmatism, and distortion aberrations in the final image (Konica Minolta, page. 6, para. 1).

Regarding Claim 7, modified Konica Minolta discloses the imaging assembly of claim 1, wherein the base lens assembly (page 7, paras. 1-7, page 8, para. 2, Fig. 1, discussing lens assemblies, group 3 and 5 [base lenses]) includes: a first base lens having a first side and a second side (page 8, paras. 1-2, discussing the first lens group 3 has an object side [first side] of the lens and an image side [second side]), at least a portion of the second side of the first base lens being concave and convex (page 9, para 1, wherein the image side of the group 3 have both convex and concave surface [see L32, L33]); and a second base lens having a first side and a second side (page 8, para. 1, wherein second lens group 5 9has an object side and an image side), at least a portion of the first side of the second base lens being concave and convex (see Fig. 1, wherein the object side is concave at the periphery of the lens and convex at the center of the lens on the object side), at least a portion of the second side of the second base lens being concave and convex (page 9, para. 1; see also Fig. 1, wherein the image side of the lens is concave relative to the image sensor at the center of the lens and convex relative to the image sensor at the periphery of the lens).
The first embodiment of Konica Minolta fails to explicitly disclose wherein at least a portion of the first side is concave. However, a second embodiment of Konica Minolta in Fig. 15A-D teaches an object side of the base lens group 3 can be concave (page 15, para. 6, Figs. 15A-D, wherein group 3 lens include a concave object side of base lens L32 and concave image side of L32). It would have been obvious to one of ordinary skill in the art to modify the first embodiment of Konica Minolta [Fig. 1] and modify the lens surface as taught by the second embodiment [Fig. 15A-D] of Konica Minolta. The motivation to do so would have been to design a lens system with a desired focal length and magnification range, thereby controlling aberrations, astigmatism, and distortion aberrations in the final image (Konica Minolta, page. 6, para. 1).

Regarding claim 8, Konica Minolta discloses the imaging assembly of claim 7, wherein the second base lens is positioned between the first base lens and the image sensor (page 1, para. 1, Fig. 1, wherein Group 5 lens [second base lens] is positioned between the image sensor and the Group 3 lenses [first base lens]).

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
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Regarding Claim 20, Konica Minolta discloses a method of capturing an image of at least one object appearing in a field of view (FOV) of an imaging device (abstract, page 1, para. 1, 2, page 6, para. 6, para. 7, paras. 1-7), the method comprising: providing a housing(page 7, para. 7, Fig. 1, discussing a zoom lens 10 held in a housing [not shown]); fixedly mounting an image sensor relative to the housing(page 7, para. 1-7, discussing imaging device camera module 50 having a zoom lens 10 and forming an object image on an image pick-up element 51 [image sensor], all within the lens barrel 54 [wherein the lens barrel is within the housing, not shown]; page 8, para. 2, 6, wherein the lens groups 1, 3, and 5 are fixed with reference to imaging surface [image sensor] 51); fixedly mounting a base lens assembly relative to the housing(page 7, paras. 1-7, page 8, para. 2, Fig. 1, discussing lens assemblies, group 3 and 5 [base lenses]; page 8, para. 2, 6, wherein the lens groups 1, 3, and 5 are fixed with reference to imaging surface [image sensor] 51); movably mounting a moveable lens relative to the housing(page 7, paras. 1-7, page 8, para. 2, Fig. 1, discussing movable lens assemblies groups 2, 4, wherein the movable lens assemblies have a drive mechanism 55a which may be a voice coil type mechanism; see Figs. 7A-C, illustrating Groups 1 and 2 moving relative to housing [not shown] while base lens groups 3 and 5 remain stationary), aligning the moveable lens, the base lens assembly, and the image sensor such that light received within the FOV passes through the moveable lens and the base lens assembly and impinges onto the image sensor(page 7, paras. 1-7, page 8, paras. 1, 2, Fig. 1, discussing the light path through the camera module is from the object OP through prism PRM, wherein the light is redirected through aligned [along AX1] moving lens group 2, then through base lens group 3, and impinges on image sensor 51 forming an image); prior to entering any one of the moveable lens and the base lens assembly, forming an original image with the light received from the FOV (see Fig. 1, wherein light enters the prism PRM [having an axis AX2], such that the object forms an "original" image when the light first enters the zoom lens, prior to being reflected along axis AX1 through the moving and base lens groups; page 6, para. 6, discussing a wide angle view and a telephoto view [interpreted as fields of view]); forming an impinging image with the light impinging onto the image sensor (page 7, para. 2, Fig. 1, discussing the imaging surface of the object on the image surface 51 forming an image I [impinging image]); and magnifying the original image via at least one of the moveable lens and the base lens assembly at a first magnification value such that a first part of the impinging image is magnified at the first magnification value relative to the original image (page 7, para. 7, page 9, para. 3, page 10, para. 9-10, Fig. 1, discussing the zoom lens 10 includes a focusing magnification mechanism in magnification lens group 2 [a first moving lens group] for magnifying a lateral portion of the image ["lateral magnification"]).
Konica Minolta fails to explicitly disclose magnifying at a second magnification value such that a second part of the impinging image is magnified at the second magnification value relative to the original image.
Roustaei, however, discusses a bar code scanner having magnification means (abstract), and teaches magnifying at a second magnification value such that a second part of the impinging image is magnified at the second magnification value relative to the original image (in a variation of the invention, a lens includes portions having different focal lengths, see, col. 24, line 65 to col. 25, line 7 and Fig. 15, discussing the lens with a double radius creates, in effect, two separate cylindrical sub-lenses 96 and 98, each with a different focal length. The light emitted by the LEDs will be focussed by both sub-lenses 96 and 98 so that two different lines of focussed light are created [thus light detected from each of the focus lines will be at a different relative magnification at different parts on the detector]).
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta with the teaching of Roustaei for the purpose of providing greater variability in the distance at which a bar code can be accurately read without requiring a change in the cylindrical lens or a compromise in the strength of the signal (Roustaei, col. 24, line 65 to col. 25, line 7).

Regarding Claim 21, modified Konica Minolta discloses the method of claim 20, further comprising positioning the base lens assembly between the moveable lens and the imaging sensor (see Fig. 1, wherein the base assembly lenses Group 3 are between the movable lens assembly Group 2 lenses and the imaging sensor 51).

Claims 4, 9, and 22 lack an inventive step under PCT Article 33(3) as being obvious over Konica Minolta in view of Roustaei et al (hereinafter Roustaei) and Ishizue.

Regarding claim 4, Konica Minolta discloses the imaging assembly of claim 3, wherein the base lens assembly and the voice coil motor are mounted at least partially within the lens barrel (page 7, para. 6-7, Fig. 1, discussing lens barrel 54 and wherein the zoom lens [including base lens assembly and voice motor coil] is held in the lens barrel).
Konica Minolta fails to explicitly disclose a lens holder.
Ishizue, however, discusses a camera module including a lens sections (abstract) and teaches a lens holder (col. 6, lines 1-32, col. 10, lines 20-30, Fig. 2, discussing an optical section 1 includes a lens section 11 and a lens barrel 12 that holds the lens section 11 and collects light from an object so as to form an image on a sensor chip 52. While the lens barrel 12 has a screw section formed on an outer peripheral surface of the lens barrel 12, a lens holder 21 provided in the lens driving section 2 has another screw 30 section formed on an inner peripheral surface of the lens holder 21. These screw sections are screwed together so that the lens barrel 12 is held by the lens holder 21). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta and provide a lens holder as taught by Ishizue. The motivation to do so would have been to hold the lens and lens barrel steady, thereby maintaining the optical axis of the camera module in the proper or central position (Ishizue, col. 6, lines 1-32).

Regarding claim 9, Konica Minolta fails to explicitly disclose the imaging assembly of claim 1, wherein the impinging image includes a barrel distortion of about and including 30% relative to the original image.
Ishizue, however, discusses a camera module including a lens sections (abstract) and teaches the image can be distorted 30% or more relative to an original image (col. 6, lines 1-22, col. 10, lines 20-30, Fig. 2, discussing an optical section 1 includes a lens section 11 and a lens barrel 12 that holds the lens section 11 and collects light from an object so as to form an image on a sensor chip 52, and wherein an image height optical distortion occurs in the lens section; col. 10, lines 20-30, wherein the distortion is 30% or more). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta and provide lens barrel distortion as taught by Ishizue. The motivation to do so would have been to obtain a preferable height-optical distortion curve that allows an amount of change in optical distortion produced by inclination of a camera module with respect to an object and an amount of change in optical distortion produced by shifting relative positions of the optical means and the sensor means (Ishizue, col. 14, lines 48-59).

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Regarding Claim 22, modified Konica Minolta discloses the method of claim 20, wherein the base lens assembly and a voice coil motor are mounted at least partially within the lens barrel (page 7, para. 6-7, Fig. 1, discussing lens barrel 54 and wherein the zoom lens [including base lens assembly and voice motor coil] is held in the lens barrel).
Konica Minolta fails to explicitly disclose a lens holder.
Ishizue, however, discusses a camera module including a lens sections (abstract) and teaches a lens holder (col. 6, lines 1-32, col. 10, lines 20-30, Fig. 2, discussing an optical section 1 includes a lens section 11 and a lens barrel 12 that holds the lens section 11 and collects light from an object so as to form an image on a sensor chip 52. While the lens barrel 12 has a screw section formed on an outer peripheral surface of the lens barrel 12, a lens holder 21 provided in the lens driving section 2 has another screw 30 section formed on an inner peripheral surface of the lens holder 21. These screw sections are screwed together so that the lens barrel 12 is held by the lens holder 21). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta and provide a lens holder as taught by Ishizue. The motivation to do so would have been to hold the lens and lens barrel steady, thereby maintaining the optical axis of the camera module in the proper or central position (Ishizue, col. 6, lines 1-32).

Claims 10 and 11 lack an inventive step under PCT Article 33(3) as being obvious over Konica Minolta in view of Roustaei et al. (hereinafter Roustaei) and Li et al. (hereinafter Li).

Regarding claim 10, Konica Minolta discloses the imaging assembly of claim 1, wherein the image sensor includes a central imaging axis that is normal to a surface of the Image sensor that is exposed to the light received within the FOV (page 7, paras. 3, Fig. 1, wherein imaging axis AX1 is orthogonal to the imaging sensor surface 51) wherein the at least one of the moveable lens and the base lens assembly is further operable to magnify from the first part of the impinging image and the first magnification value (page 7, para. 7, page 9, para. 3, page 10, para. 9-10, Fig. 1, discussing the zoom lens 10 includes a focusing magnification mechanism in magnification lens group 2 [a first moving lens group] for magnifying a lateral portion of the image ["lateral magnification" of the image]).
Konica Minolta fails to explicitly disclose progressive magnification from the first part of the impinging image and the first magnification value to the second part of the impinging image and the second magnification value.
Li, however, teaches progressive magnification between a first and second magnification (col. 3, lines 8-18, col. 4, lines 56-67, discussing a bar code scanner comprising a first collection optical system having an optical axis [first portion] and a first magnification, a detector disposed along the optical axis and in optical communication with the first collection optical system, a second collection optical system having a second magnification greater than the first magnification [i.e., progressive magnification] and having an optical axis [second portion] and displacing means operable for selectively moving the second collection optical system to dispose the optical axis thereof in coincidence with the optical axis of the first collection optical system). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta and use a second magnification as taught by Li. The motivation to do so would have been to selectively and quickly magnify an area of an image thereby increasing discernment of the area being magnified (Li, col. 1, lines 1-6).

Regarding claim 11, Konica Minolta discloses the imaging assembly of claim 10, wherein the impinging image is defined by central imaging axis (page 7, paras. 3, Fig. 1, wherein imaging axis AX1 is orthogonal to the imaging sensor surface 51).
Konica Minolta fails to explicitly disclose wherein the second magnification value is greater than the first magnification value.
Li, however, teaches wherein the second magnification value is greater than the first magnification value (col. 3, lines 8-18, col. 4, lines 56-67, discussing a bar code scanner comprising a first collection optical system having an optical axis [first portion] and a first magnification, a detector disposed along the optical axis and in optical communication with the first collection optical system, a second collection optical system having a second magnification greater than the first magnification and having an optical axis [second portion] and displacing means operable for selectively moving the second collection optical system to dispose the optical axis thereof in coincidence with the optical axis of the first collection optical system). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta and use a second magnification as taught by Li. The motivation to do so would have been to selectively and quickly magnify an area of an image thereby increasing discernment of the area being magnified (Li, col. 1, lines 1-6).

Claim 12 lacks an inventive step under PCT Article 33(3) as being obvious over Konica Minolta in view of Roustaei et al. (hereinafter Roustaei), Humphrey, and Li et al. (hereinafter Li).

Regarding claim 12, Konica Minolta discloses the imaging assembly of claim 1, wherein the first magnification value provides a negative magnification (page 6, para. 6, wherein the lateral magnification is -1).
Konica Minolta fails to explicitly disclose wherein the second magnification value provides a positive magnification.
Li, however, teaches wherein the second magnification value is greater than the first magnification value (col. 3, lines 8-18, col. 4, lines 56-67, discussing a bar code scanner comprising a first collection optical system having an optical axis [first portion] and a first magnification, a detector disposed along the optical axis and in optical communication with the first collection optical system, a second collection optical system having a second magnification greater than the first magnification and having an optical axis [second portion] and displacing means operable for selectively moving the second collection optical system to dispose the optical axis thereof in coincidence with the optical axis of the first collection optical system). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta and use a second magnification as taught by Li. The motivation to do so would have been to selectively and quickly magnify an area of an image thereby increasing discernment of the area being magnified (Li, col. 1, lines 1-6).
Modified Konica Minolta fails to explicitly disclose the second magnification is positive.
Humphrey, however, discusses the first of said telescopes having a magnification power of M1 and the second telescope having a magnification power of M2 adapted to receive light from the first telescope (abstract) and teaches the second telescope having a positive magnification (col. 3, lines 1-2, wherein stabilized telescope C is a telescope having a positive magnification). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta and cascade lenses wherein the second lens has a positive magnification correlated to the first magnification as taught by Humphrey. The motivation to do so would have been to attain balanced magnifications, thereby compensating for accidental motion and achieving an optically stabilized image (Humphrey, col. 1, lines 39-55, col. 6, lines 52-56).

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Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
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Claim 13 lacks an inventive step under PCT Article 33(3) as being obvious over Konica Minolta in view of Roustaei et al. (hereinafter Roustaei) and McJohnson et al. (hereinafter McJohnson).

Regarding Claim 13, modified Konica Minolta fails to explicitly disclose the imaging assembly of claim 1, wherein the FOV is static. McJohnson, however, discusses a bar code reader (abstract) and teaches a static bar code reader field of view (col. 1, lines 55-col. 2, line 10, discussing a static bar code reader that provides for little relative movement between an item being read and the reader itself in order to identify a stationary object). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta with the teaching of McJohnson. The motivation to do so would have been to limit relative movement between the reader and the item being read, thereby increasing the ease at which bar codes can be read (McJohnson, col. 1, line 55-col. 2, line 10).

Claim 14 lacks an inventive step under PCT Article 33(3) as being obvious over Konica Minolta in view of Li et al. (hereinafter Li).

Regarding Claim 14, Konica Minolta discloses an imaging device for capturing an image of at least one object appearing in a field of view (FOV) (abstract, page 1, para. 1, 2, page 6, para. 6, para. 7, paras. 1-7), the imaging scanner comprising: a housing(page 7, para. 7, Fig. 1, discussing a zoom lens 10 held in a housing [not shown]); an image sensor fixedly mounted relative to the housing(page 7, para. 1-7, discussing imaging device camera module 50 having a zoom lens 10 and forming an object image on an image pick-up element 51 [image sensor], all within the lens barrel 54 [wherein the lens barrel is within the housing, not shown]; page 8, para. 2, 6, wherein the lens groups 1, 3, and 5 are fixed with reference to imaging surface [image sensor] 51); a base lens assembly fixedly mounted relative to the housing(page 7, paras. 1-7, page 8, para. 2, Fig. 1, discussing lens assemblies, group 3 and 5 [base lenses]; page 8, para. 2, 6, wherein the lens groups 1, 3, and 5 are fixed with reference to imaging surface [image sensor] 51); and a moveable lens movably mounted relative to the housing(page 7, paras. 1-7, page 8, para. 2, Fig. 1, discussing movable lens assemblies groups 2, 4, wherein the movable lens assemblies have a drive mechanism 55a which may be a voice coil type mechanism; see Figs. 7A-C, illustrating Groups 1 and 2 moving relative to housing [not shown] while base lens groups 3 and 5 remain stationary), wherein: the moveable lens, the base lens assembly, and the image sensor are aligned such that light received from the FOV passes through the moveable lens and the base lens assembly and impinges onto the image sensor(page 7, paras. 1-7, page 8, paras. 1, 2, Fig. 1, discussing the light path through the camera module is from the object OP through prism PRM, wherein the light is redirected through aligned [along AX1] moving lens group 2, then through base lens group 3, and impinges on image sensor 51); prior to entering any one of the moveable lens and the base lens assembly, the light received within the FOV forms an original image(see Fig. 1, wherein light enters the prism PRM [having an axis AX2], such that the object forms an "original" image when the light first enters the zoom lens, prior to being reflected along axis AX1 through the moving and base lens groups; page 6, para. 6, discussing a wide angle view and a telephoto view [interpreted as fields of view]); the light received from the FOV that impinges onto the image sensor forms an impinging image(page 7, paras. 1-7, page 8, paras. 1, 2, Fig. 1, discussing the light path through the camera module is from the object OP through prism PRM, wherein the light is redirected through aligned [along AX1] moving lens group 2, then through base lens group 3, and impinges on image sensor 51 forming an image; page 7, para. 2, Fig. 1, discussing the imaging surface of the object on the image surface 51 forming an image I [impinging image]); and the base lens assembly (page 7, paras. 1-7, page 8, para. 2, Fig. 1, discussing lens assemblies, group 3 and 5 [base lenses]) includes a first base lens having a first side(page 8, paras. 1-2, discussing the lens groups have an object side [first side] of the lens and an image side [second side]) and having a second side (page 8, paras. 1-2, discussing the lens groups have an object side [first side] of the lens and an image side [second side]) that is at least partially both concave and convex (page 8, para 1, wherein the image side of the group 3 have both convex and concave surface [see L32, L33]).
The first embodiment of Konica Minolta fails to explicitly disclose whereln at least a portion of the first side is concave. However, a second embodiment of Konica Minolta in Fig. 15A-D teaches an object side of the base lens group 3 can be concave (page 15, para. 6, Figs. 15A-D, wherein group 3 lens include a concave object side of base lens L32 and concave image side of L32). It would have been obvious to one of ordinary skill in the art to modify the first embodiment of Konica Minolta [Fig. 1] and modify the lens surface as taught by the second embodiment [Fig. 15A-D] of Konica Minolta. The motivation to do so would have been to design a lens system with a desired focal length and magnification range, thereby controlling aberrations, astigmatism, and distortion aberrations in the final image (Konica Minolta, page. 6, para. 1).
Konica Minolta fails to explicitly disclose an imaging scanner.
Li, however, discusses an optical device (abstract) and teaches a bar code imaging scanner (col. 3, lines 1-18). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta and use the system in a bar code scanner as taught by Li. The motivation to do so would have been to create a product that can image as well as magnify an object bar code for use in retail settings (Li, col. 3, lines 1-18).

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Claims 15, 18, and 19 lack an inventive step under PCT Article 33(3) as being obvious over Konica Minolta in view of Li et al. (hereinafter Li) and Roustaei et al. (hereinafter Roustaei).

Regarding Claim 15, Konica Minolta discloses the imaging scanner of claim 14, wherein the first base lens is configured to at least partially cause a first part of the impinging image to be magnified relative to the original image at a first magnification value(page 7, para. 7, page 9, para. 3, page 10, para. 9-10, Fig. 1, discussing the zoom lens 10 includes a focusing magnification mechanism in magnification lens group 2 [a first moving lens group] for magnifying a lateral portion of the image ["lateral magnification"]).
Konica Minolta fails to explicitly disclose wherein the first base lens is further configured to at least partially cause a second part of the impinging image to be magnified relative to the original image at a second magnification value.
Roustaei, however, discusses a bar code scanner having magnification means (abstract), and teaches a lens is configured to at least partially cause a second part of an impinging image to be magnified relative to the original image at a second magnification value (in a variation of the invention, a lens includes portions having different focal lengths, see, col. 24, line 65 to col. 25, line 7 and Fig. 15, discussing the lens with a double radius creates, in effect, two separate cylindrical sub-lenses 96 and 98, each with a different focal length. The light emitted by the LEDs will be focussed by both sub-lenses 96 and 98 so that two different lines of focussed light are created [thus light detected from each of the focus lines will be at a different magnification at different parts on the detector]).
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta with the teaching of Roustaei for the purpose of providing greater variability in the distance at which a bar code can be accurately read without requiring a change in the cylindrical lens or a compromise in the strength of the signal (Roustaei, col. 24, line 65 to col. 25, line 7).

Regarding Claim 18, modified Konica Minolta discloses the imaging scanner of claim 14, wherein the image sensor includes a central imaging axis that is normal to a surface of the image sensor that is exposed to the light received from the FOV(page 7, paras. 3, Fig. 1, wherein imaging axis AX1 is orthogonal to the imaging sensor surface 51), the first part of the impinging image being magnified at a first magnification value relative to the original image (page 7, para. 7, page 9, para. 3, page 10, para. 9-10, Fig. 1, discussing the zoom lens 10 includes a focusing magnification mechanism in magnification lens group 2 [a first moving lens group] for magnifying a lateral portion of the image ["lateral magnification" of the image]).
Konica Minolta fails to explicitly disclose wherein at least one of the moveable lens and the base lens assembly is operable to progressively magnify from a first part of the impinging image to a second part of the impinging image, and the second part of the impinging image being magnified at a second magnification value relative to the original image.
Roustaei, however, discusses a lens assembly is operable to magnify from a first part of the impinging image to a second part of the impinging image, and the second part of the impinging image being magnified at a second magnification value relative to the original image (in a variation of the invention, a lens includes portions having different focal lengths, see, col. 24, line 65 to col. 25, line 7 and Fig. 15, discussing the lens with a double radius creates, in effect, two separate cylindrical sub-lenses 96 and 98, each with a different focal length. The light emitted by the LEDs will be focussed by both sub-lenses 96 and 98 so that two different lines of focussed light are created [thus light detected from each of the focus lines will be at a different magnification at different parts on the detector]).
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta with the teaching of Roustaei for the purpose of providing greater variability in the distance at which a bar code can be accurately read without requiring a change in the cylindrical lens or a compromise in the strength of the signal (Roustaei, col. 24, line 65 to col. 25, line 7).
Li teaches progressive magnification between a first and second magnification (col. 3, lines 8-18, col. 4, lines 56-67, discussing a bar code scanner comprising a first collection optical system having an optical axis [first portion] and a first magnification, a detector disposed along the optical axis and in optical communication with the first collection optical system, a second collection optical system having a second magnification greater than the first magnification [i.e., progresslve magnification] and having an optical axis [second portion] and displacing means operable for selectively moving the second collection optical system to dispose the optical axis thereof in coincidence with the optical axis of the first collection optical system). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta as taught by Li. The motivation to do so would have been to selectively and quickly magnify an area of an image thereby increasing discernment of the area being magnified (Li, col. 1, lines 1-6).

Regarding Claim 19, modified Konica Minolta discloses the imaging scanner of claim 14, wherein the second part of the impinging image is defined by central imaging axis(page 7, paras. 3, Fig. 1, wherein imaging axis AX1 is orthogonal to the imaging sensor surface 51).
Konica Minolta fails to explicitly disclose wherein the second magnification value is greater than the first magnification value.
Li, however, teaches wherein the second magnification value is greater than the first magnification value (col. 3, lines 8-18, col. 4, lines 56-67, discussing a bar code scanner comprising a first collection optical system having an optical axis [first portion] and a first magnification, a detector disposed along the optical axis and in optical communication with the first collection optical system, a second collection optical system having a second magnification greater than the first magnification and having an optical axis [second portion] and displacing means operable for selectively moving the second collection optical system to dispose the optical axis thereof in coincidence with the optical axis of the first collection optical system). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta and use a second magnification as taught by Li. The motivation to do so would have been to selectively and quickly magnify an area of an image thereby increasing discernment of the area being magnified (Li, col. 1, lines 1-6).

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Claim 16 lacks an inventive step under PCT Article 33(3) as being obvious over Konica Minolta in view of Li et al. (hereinafter Li), Roustaei et al. (hereinafter Roustaei), and Humphrey.

Regarding Claim 16, Konica Minolta discloses the imaging scanner of claim 15, wherein the first magnification value provides a negative magnification (page 6, para. 6, wherein the lateral magnification is -1).
Konica Minolta fails to explicitly disclose wherein the second magnification value provides a positive magnification.
Humphrey, however, discusses the first of said telescopes having a magnification power of M1 and the second telescope having a magnification power of M2 adapted to receive light from the first telescope (abstract) and teaches the second telescope having a positive magnification (col. 3, lines 1-2, wherein Stabilized telescope C is a telescope having a positive magnification). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta and cascade lenses wherein the second lens has a positive magnification correlated to the first magnification as taught by Humphrey. The motivation to do so would have been to attain balanced magnifications, thereby compensating for accidental motion and achieving an optically stabilized image (Humphrey, col. 1, lines 39-55, col. 6, lines 52-56).

Claim 17 lacks an inventive step under PCT Article 33(3) as being obvious over Konica Minolta in view of Li et al. (hereinafter Li) and McJohnson et al. (hereinafter McJohnson).

Regarding Claim 17, Konica Minolta falls to explicitly disclose the imaging scanner of claim 14, wherein the FOV is static.
McJohnson, however, discusses a bar code reader (abstract) and teaches a static bar code reader field of view (col. 1, lines 55-col. 2, line 10, discussing a static bar code reader that provides for little relative movement between an item being read and the reader itself in order to identify a stationary object). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Konica Minolta with the teaching of McJohnson. The motivation to do so would have been to limit relative movement between the reader and the item being read, thereby increasing the ease at which bar codes can be read (McJohnson, col. 1, line 55-col. 2, line 10).

Claims 1-22 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.