

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BIO IMAGING SAS D/B/A VILBER,
Petitioner,

v.

SPECTRAL INSTRUMENTS IMAGING, LLC,
Patent Owner.

Case IPR2023-00449
Patent No. 8,901,516

EXPERT DECLARATION OF DAVID W. PISTON, PH.D.

I 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.



David W. Piston, Ph.D.

4/25/2023

Dated

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I, David W. Piston, Ph.D., declare as follows:

I. INTRODUCTION

1. I have been retained by Patent Owner Spectral Instruments Imaging, LLC (“Spectral” or “Patent Owner”) as an independent expert consultant in this proceeding before the United States Patent and Trademark Office (“USPTO”) Patent Trial and Appeal Board (“PTAB” or “Board”) regarding petition for an *Inter Partes* Review (“IPR”) of U.S. Patent No. 8,901,516 (“the ’516 patent”) (EX1001) filed by Petitioner Bio Imaging SAS d/b/a Vilber (“Petitioner” or “Vilber”). I have been asked to consider whether certain references disclose or suggest the limitations recited in claims 1 to 27 (“Challenged Claims”) of the ’516 patent. My opinions are set forth below.

2. I am being compensated at my standard rate of \$600 per hour for the time I spend on this matter. My compensation is in no way contingent on the nature of my findings, the presentation of my findings in testimony, or the outcome of this or any other proceeding. I have no other interest in this proceeding.

II. BACKGROUND AND QUALIFICATIONS

3. I received a B.A. in Physics from Grinnell College and an M.S. and Ph.D. in physics from the University of Illinois. My dissertation was titled “Dynamics of Biological Macromolecules Investigated by Fluorescence Depolarization” and focused on using time-resolved fluorescence to investigate

nanosecond dynamics. I subsequently completed a postdoctoral research fellowship in Applied Physics with Watt Webb at Cornell University, where I studied quantitative biophysical imaging using two-photon excitation microscopy.

4. In 1992, I joined the faculty at Vanderbilt University, where I remained until the end of 2014, when I moved to Washington University. Since 2015, I have served as the Edward J. Mallinckrodt Jr. Professor and Head, Department of Cell Biology & Physiology.

5. I have received a number of honors including a Beckman Young Investigator Award (1993), NIH Study Section Chair (2004–2006 and 2022–2024), Searle Scholars Advisory Board (2006-20112), election as a Fellow of the American Physical Society (2000), the Microscopy Society of America (2014), the American Association for the Advancement of Science (2015), and the Distinguished Scientist Award from the Microscopy Society of America (2017).

6. I have a long history of inventing new fluorescence spectroscopy and microscopy approaches and applying them to open questions about biological mechanisms. My work includes patents on fluorescence lifetime measurement and imaging as well as fluorescent proteins and fluorescence resonance energy transfer.

7. My diverse research group focuses on the understanding the molecular mechanisms that underlie hormone secretion from islets of Langerhans in the pancreas. Driven by this biomedical focus, my lab develops, optimizes, and applies

novel fluorescence microscopies and probes, largely based on the Green Fluorescent Protein and its relatives.

8. My lab combines these new approaches for measuring multiple molecular pathways using novel hyperspectral and lifetime imaging towards discovering mechanisms that underlie functional behaviors of constituent islet cell types *in situ* and *in vivo* at various points along both glucose-regulated and non-glucose-regulated signaling pathways.

9. A copy of my CV is included as EX2002. My CV includes a list of all publications that I have authored in the previous ten years.

III. MATERIALS CONSIDERED AND SUMMARY OF OPINIONS

10. The opinions contained in this Declaration are based on the documents I reviewed and my professional judgment, as well as my education, experience, and/or knowledge regarding technologies relating to, among other things, fluorescent imaging.

11. In forming my opinions expressed in this Declaration, I reviewed the following materials (and any other materials that I reference in this Declaration):

Paper 1	Petition For Inter Partes Review of U.S. Patent No. 8,901,516 (“Petition”)
EX1001	U.S. Patent No. 8,901,516
EX1002.1	U.S. Patent No. 8,901,516 File History (Part 1)
EX1002.2	U.S. Patent No. 8,901,516 File History (Part 2)

EX1004	Declaration of Joseph John Talghader, Ph.D.
EX1005	U.S. Provisional Patent Application 61/379,282
EX1040	Japanese Patent Publication No. 2004-325174 (“Olympus”) (English Translation)
EX2003	Olympus Corporation’s Online Microscopy Resource Center - Publications (July 21, 2004)
EX2004	Olympus Corporation’s Online Microscopy Resource Center - Publications (March 6, 2010)
EX2005	Olympus Corporation’s Online Microscopy Resource Center - Digital Imaging in Optical Microscopy (Apr. 26, 2003)
EX2006	Olympus Corporation’s Online Microscopy Resource Center - Digital Imaging in Optical Microscopy (Apr. 26, 2003)
EX2007	Mortimer Abramowitz, MICROSCOPE: BASICS AND BEYOND (2003)

12. In support of my opinions, I have taken into account how a person of ordinary skill in the art (as defined below in Section IV) would have understood the claims and the specification of the ’516 patent at the time of the alleged invention. My opinions take into account how a person of ordinary skill in the art would have understood the ’516 patent, the prior art to the patent, and the state of the art at the time of the alleged invention.

13. As I discuss in detail below, it is my opinion that none of the references cited by Petitioner disclose or suggest the limitations recited in claims 1 to 27 of the ’516 patent.

IV. PERSON OF ORDINARY SKILL IN THE ART

14. I have been asked to consider the time of the alleged invention for the '516 patent to be the early 2010 time frame, including and up to September 1, 2010 and August 31, 2011, which I understand are the filing dates of U.S. Provisional Patent Application 61/379,282, to which I understand the '516 patent claims priority, and the '516 patent. EX1001 ('516 patent), at Cover; EX1005 ('282 prov). I may refer to this time frame in this declaration as the time of the alleged invention, the relevant time, or the time of the '516 patent.

15. I understand Petitioner has identified a person of ordinary skill in the art ("POSITA") as the following, which, for the purposes of the patent owner's preliminary response only, I have been asked to adopt as my own:

A person of ordinary skill in the art at the time of the alleged invention of the '516 patent ("POSA"). should have an understanding of light sources, structures for holding and electrically connecting the light sources, optical devices such as filters and diffusers, cameras, and control systems to operate the light sources. A POSA would have at least a bachelor's degree in engineering or physics and about two years of experience in imaging systems or studies or research relating to light sources used in imaging systems. Additional education may supplement practical experience and additional practical experience may supplement education. EX1004, ¶ 22.

Petition, at 20. I reserve the right to propose an alternative level of skill in the art should the Board decide to institute this IPR.

V. CLAIM CONSTRUCTION

16. I understand that claim terms are to be given their plain and ordinary meanings, as would have been understood by a POSITA, at the time of the alleged invention, taking into consideration the language of the claims, the specification, and the prosecution history (EX1002) of the '516 patent.

17. I further understand that the Board will only construe claims necessary to determine whether to institute the IPR. I do not believe any claim terms require construction for the Board to deny institution of this IPR. I reserve the right to identify constructions should the board institute this IPR.

VI. OLYMPUS DOES NOT ANTICIPATE ANY CHALLENGED CLAIM OF THE '516 PATENT

18. I understand that a claim is unpatentable as “anticipated” under 35 U.S.C. § 102 if a single prior art reference discloses each and every limitation of the claim arranged as in the claim. I understand that a prior art reference does not anticipate a claim, however, when it discloses multiple, distinct teachings that a person of ordinary skill in the art might manage to combine and thus achieve the claimed invention unless the person of skill in the art would readily envisage the claimed arrangement or combination in view of the reference.

19. I understand that a dependent claim has the limitations of the independent claim from which the dependent claim depends. Thus, I understand a

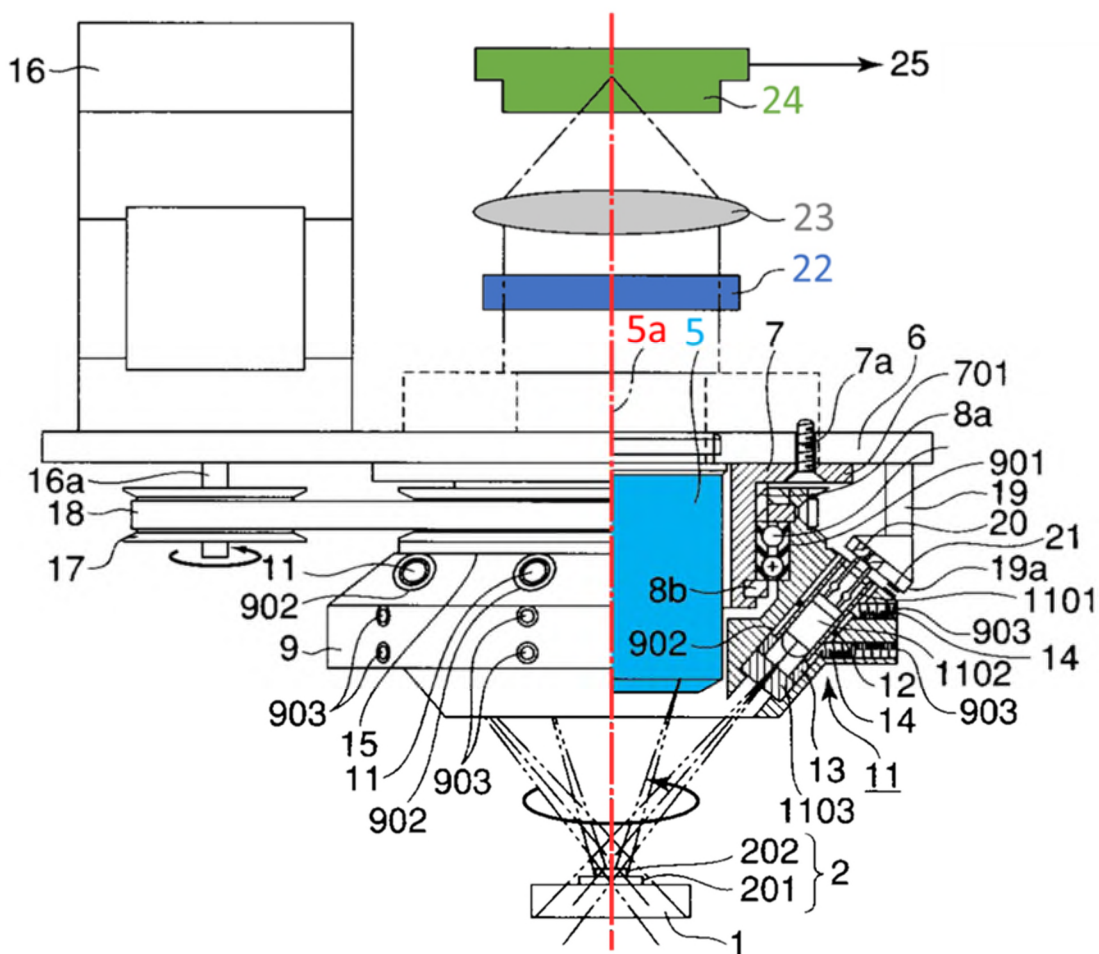
dependent claim is not anticipated by a prior art reference if the independent claim from which the dependent claim depends is not anticipated by the prior art reference.

A. Olympus Does Not Disclose a Camera Mounted to a Same Support Structure as a Housing

20. Each of the independent challenged claims 1, 14, and 25 require a “camera” and further require that the “camera” be mounted to the same “support structure” to which a housing is also mounted. Petitioner appears to identify “light source holding member 9” as the “housing.” Petition, at 35 (claim 1), 49–50 (claim 14), 55 (claim 25); *see also* EX1004 (Talghader Decl.), ¶¶ 86–87, 101. Independent claim 14 states “an excitation light source assembly [is] mounted to said support structure.” The “excitation light source assembly compris[es] a housing....” For simplicity, I have grouped all three independent claims as requiring a housing attached to the support structure, but I reserve the right to analyze independent claim 14 as requiring an excitation light source assembly mounted to the support structure.

21. Petitioner identified the claimed “camera” as “photodetector/CCD camera 24” and, in some instances, as “e.g., photodetector/CCD camera 24 and associated lenses.” Petition, at 36, 49, 55. In contrast, Petitioner’s expert identified only “photodetector or CCD camera 24” as the camera. EX1004 (Talghader Decl.), ¶ 92.

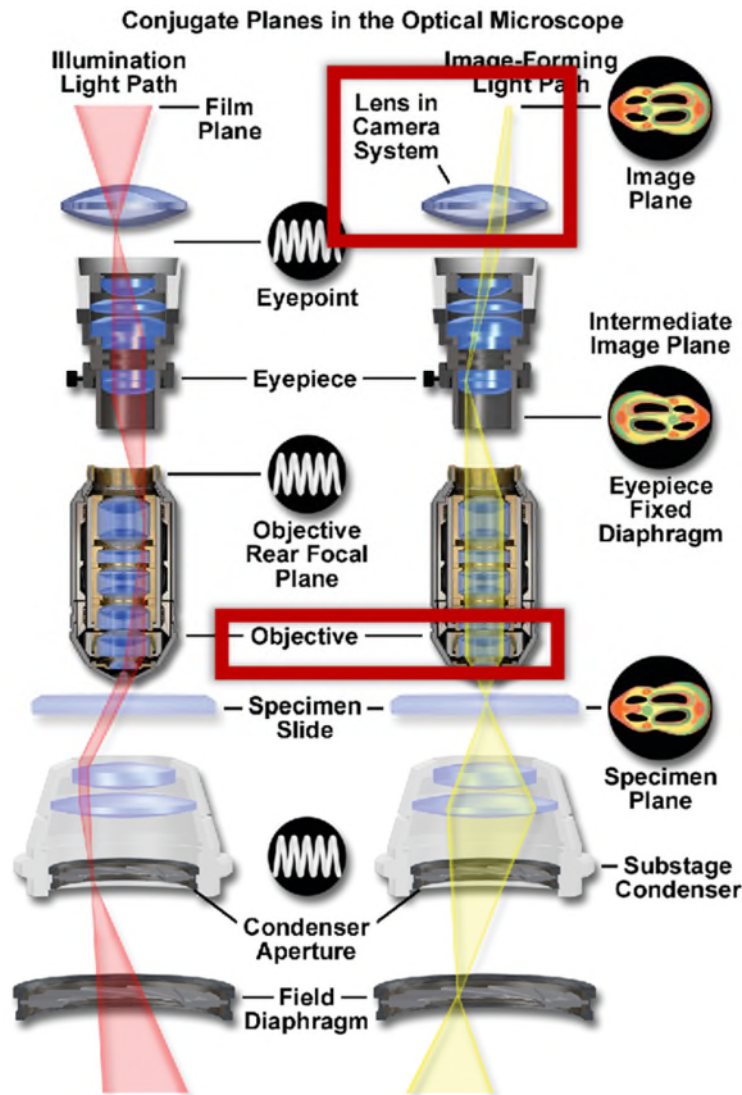
22. The Petition does not explicitly state what is meant by “associated lenses.” Olympus identified Sample Table 1 as where “a sample is placed.” *E.g.*, Olympus, at claim 1. As shown below, Olympus identifies two “lenses” between “photodetector/CCD camera 24” and Sample Table 1: “5 -- object lens” and “23 -- image formation lens.” Olympus, EX1040, at 30.



Olympus, Figure 1 (Annotated)

23. A POSITA would understand that an objective lens, such as the “object lens” 5, would be similar to a microscope objective, which is separate from any

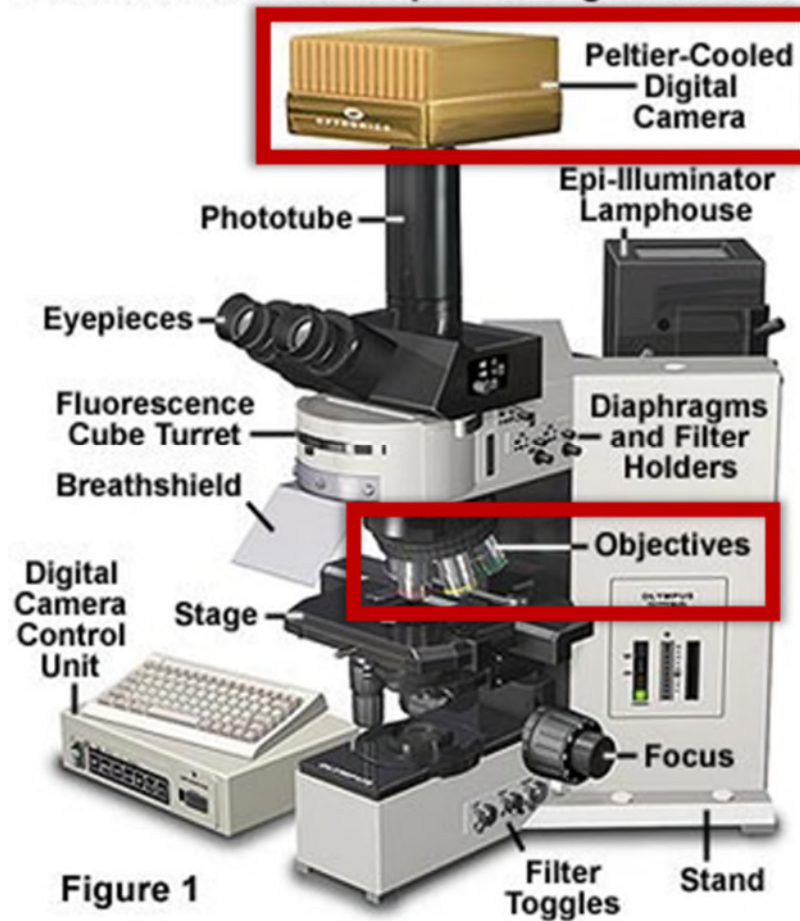
camera. For example, from at least 2004 to 2010, Olympus Corporation openly distributed “Mortimer Abramowitz’s renowned introduction to optical microscopy” (EX2003, at 3 (2004); EX2004, at 3 (2010)), which emphasizes the difference between an “Objective” lens and a “Lens in [the] Camera System:”



EX2007, at 35 (annotations added).

24. Olympus Corporation also showed a diagram of a “Fluorescence Microscope with Digital Camera” on its website from at least 2003 to 2012, in which “Objective” lenses were shown as separate components from a “Digital Camera”:

Fluorescence Microscope with Digital Camera

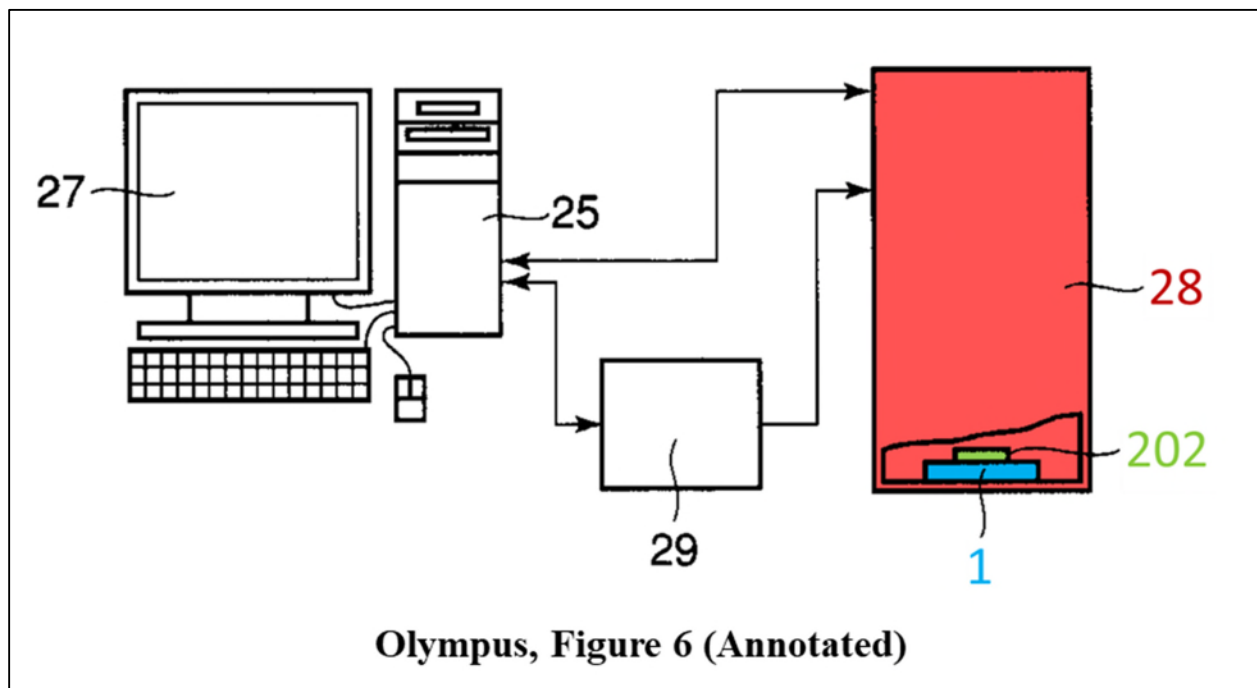


EX2005, at 1 (2003) (annotations added); EX2006, at 1 (2012).

25. Thus, I disagree with Petitioner (as Petitioner’s expert also apparently does) to the extent Petitioner alleges objective lens 5 is part of a camera.

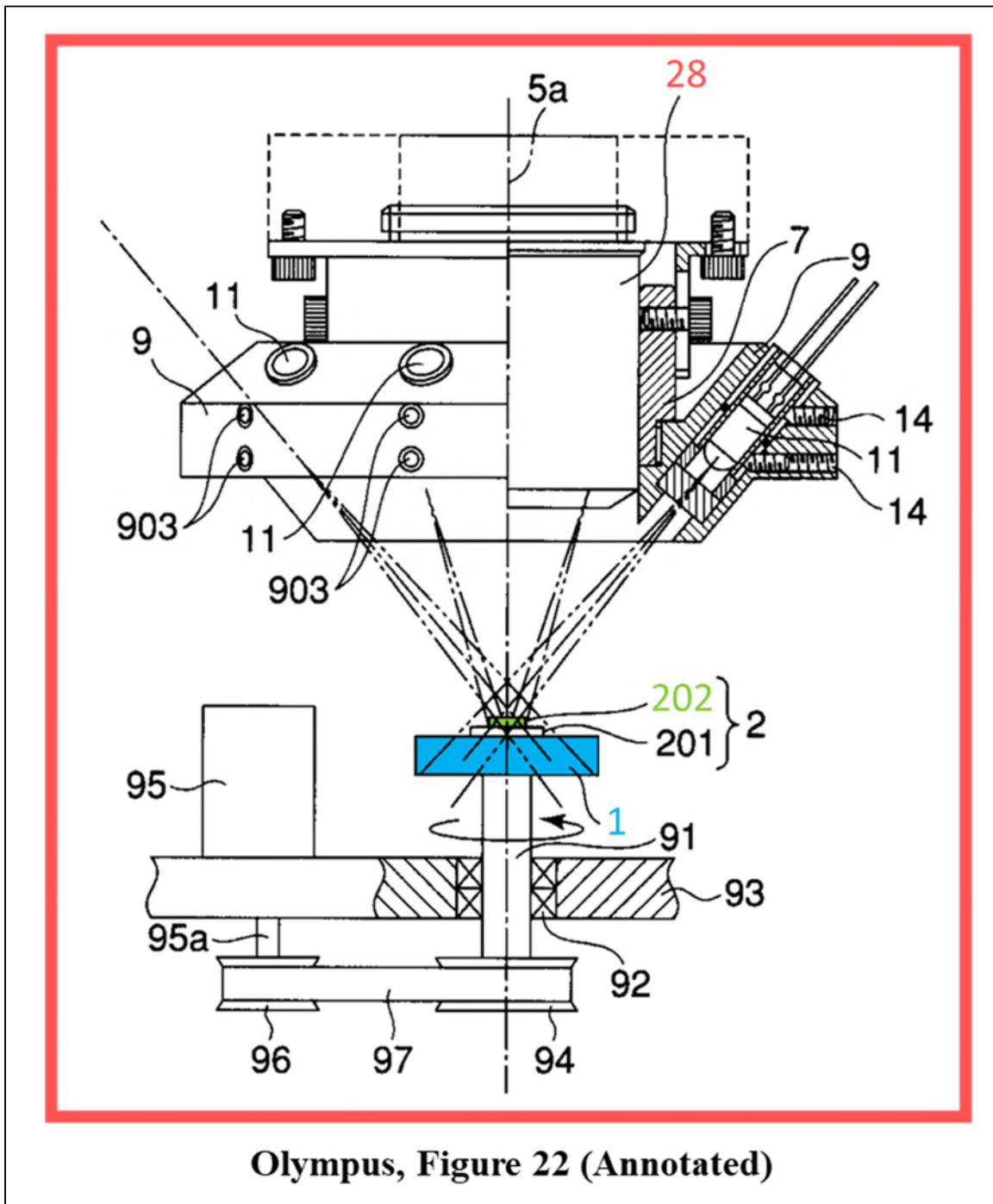
26. Petitioner also appears to identify “fluorescence detecting unit 28” in figure 22 as “the camera.” Petition, at 50. Petitioner’s expert does not identify “fluorescence detecting unit 28” in figure 22 as “the camera.”

27. I disagree with Petitioner’s characterization of “fluorescence detecting unit 28” in figure 22 as a camera, because a POSITA would not consider the “fluorescence detecting unit 28” in Olympus to be a camera. For example, Olympus figure 6 is a block diagram showing an entire fluorescence inspection device according to a 1 embodiment.” Olympus, at Description of the Drawings.



28. Olympus also explains that the “reference numerals as in FIG. 1 [1 embodiment] denote the same reference numerals” as “the 6 [sic, 6th] embodiment [Figure 22].” Olympus, ¶ 202. Thus, as shown below, it is my opinion that a

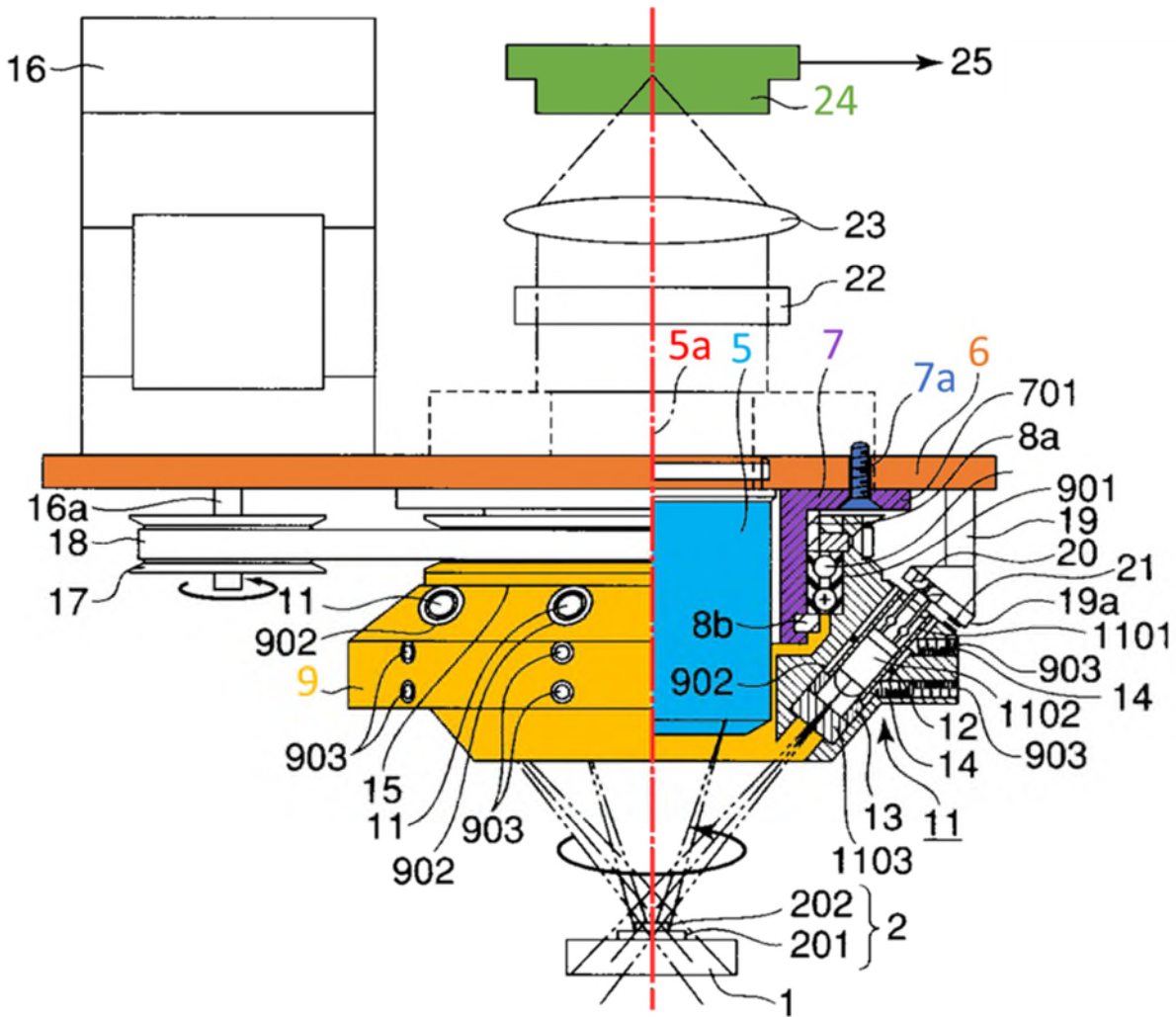
POSITA would understand the “fluorescence detecting unit 28” in Figure 22 to be a reference to the entire cabinet (outlined in red in the annotated version of Figure 6 above and annotated version of Figure 22 below).



29. Petitioner also does not appear to expressly define any “support structure” in its analysis of independent claim 1 or independent claim 25 (the analysis of which merely cites back to the analysis of independent claim 1). Petitioner appears to associate, but does not expressly identify, “base 6, shaft 7, bearing 8, C-ring 8b, and associated hardware” with the “support structure.” Petition, at 35. Petitioner then provides two competing definitions of “support structure” in its analysis of independent claim 14: “e.g., base 6, shaft 7, bearing 8, C-ring 8b, and associated hardware;” and “a cylindrical fixed shaft 7 and associated hardware.” Petition, at 49–50.

30. Regardless of what Petitioner seeks to identify as the “support structure,” it is my opinion that Olympus does not disclose any camera, as that term would be understood by a POSITA, as discussed above, mounted to said support structure. As shown below in annotated Figure 1, photodetector 24 is not connected or mounted to either base 6, shaft 7, or anything else¹ Petitioner broadly alleges may qualify as a “support structure.” Indeed, Olympus is silent as to any mounting of photodetector 24.

¹ Optical axis 5a is also not a support structure—it is an imaginary line denoting the axis.



Olympus, Figure 1 (Annotated)

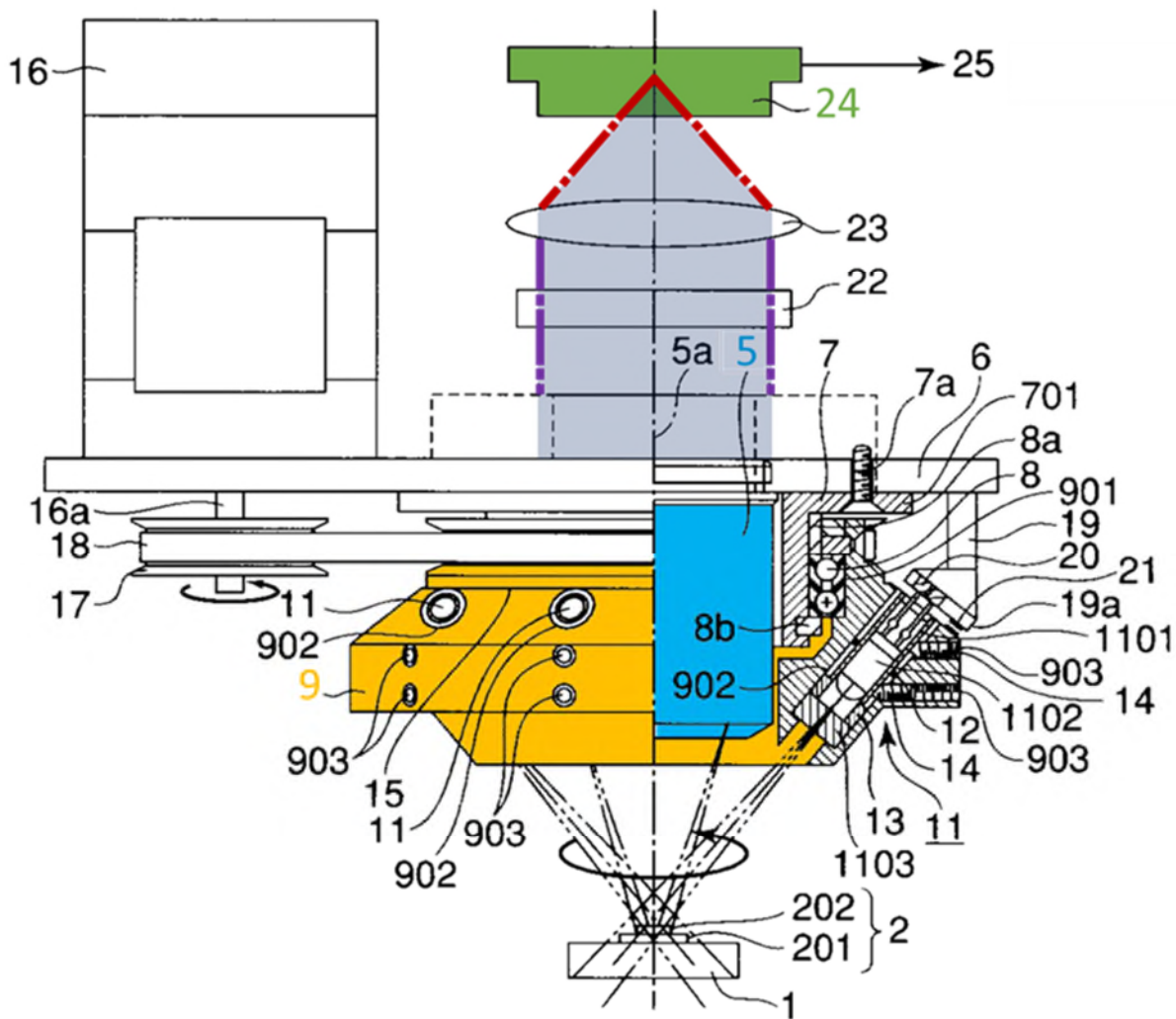
B. Olympus Does Not Disclose a Camera Having a Field Of View Unobstructed by the Housing

31. It is also my opinion that Olympus does not disclose a camera having a field of view unobstructed by the housing.

32. As explained above, the only component identified by Petitioner that could possibly be the “camera” is photodetector 24. However, it is my opinion that the field of view of photodetector 24 would be obstructed by the housing 9. When

using a camera with an objective lenses, a POSITA would make sure the camera field of view is larger than the back aperture of the objective lens. Otherwise, light coming from the sample would be lost. A POSITA would consider the fluorescence path, which goes from sample to objective lens, objective lens to optics lens, and optics lens to camera/eyepiece. The signal/light collection is maximized using the objective lens, as limited by experimental and physical constraints. Then, to ensure the signal/light coming out from the back of objective lens is not lost, the aperture of the optics and camera is made larger than needed (*i.e.* the functional field of view of the camera is in excess).

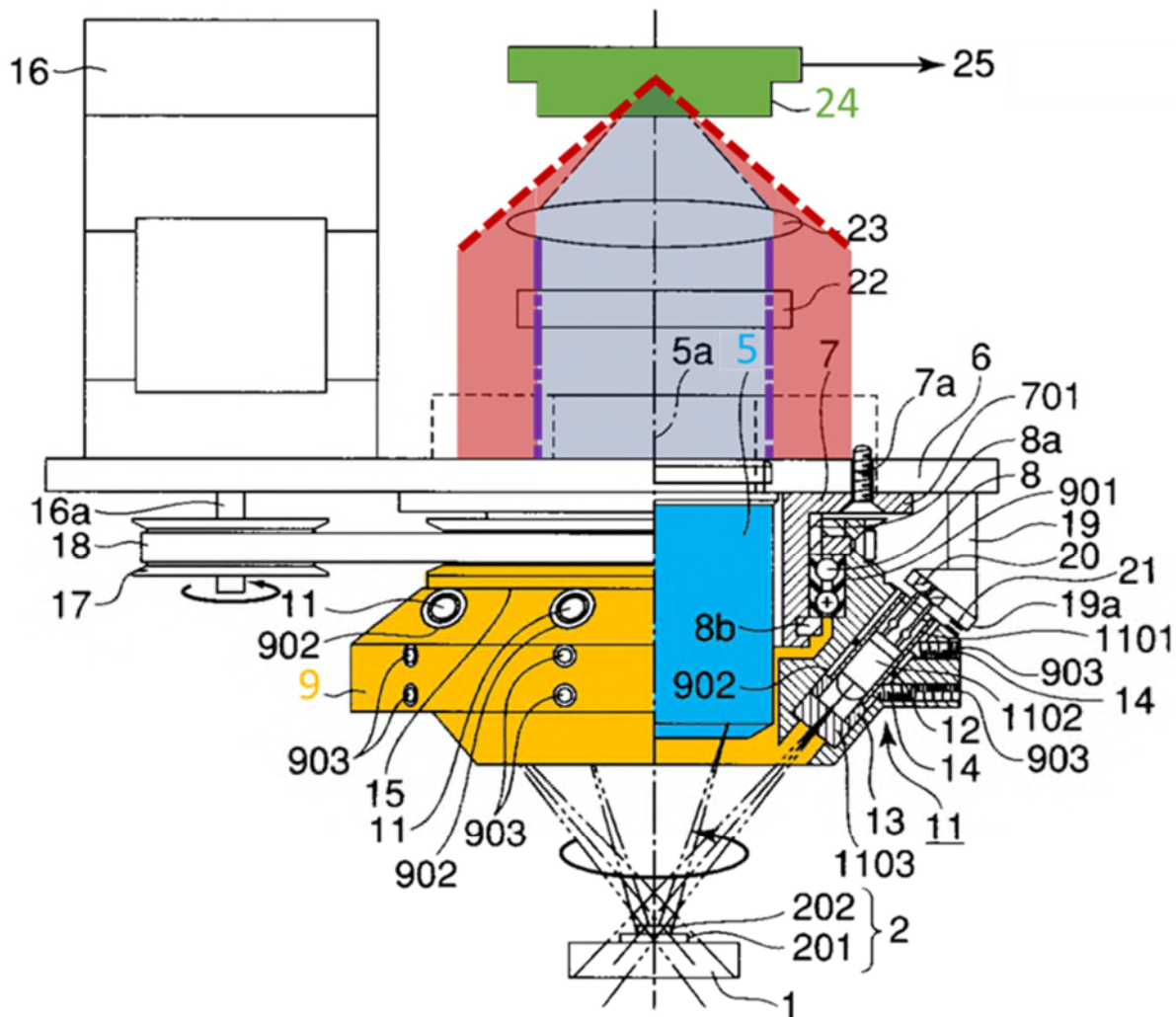
33. In the annotated Figure 1 below, the **purple dashed lines** appear to indicate the image/light coming out of the condenser lens 5 (**shaded dark blue**) and being funneled into the **photodetector 24**. Thus, it is my opinion that a POSITA would understand the **red dashed lines** to represent the portion of the field of view corresponding to the image/light coming from the condenser lens.



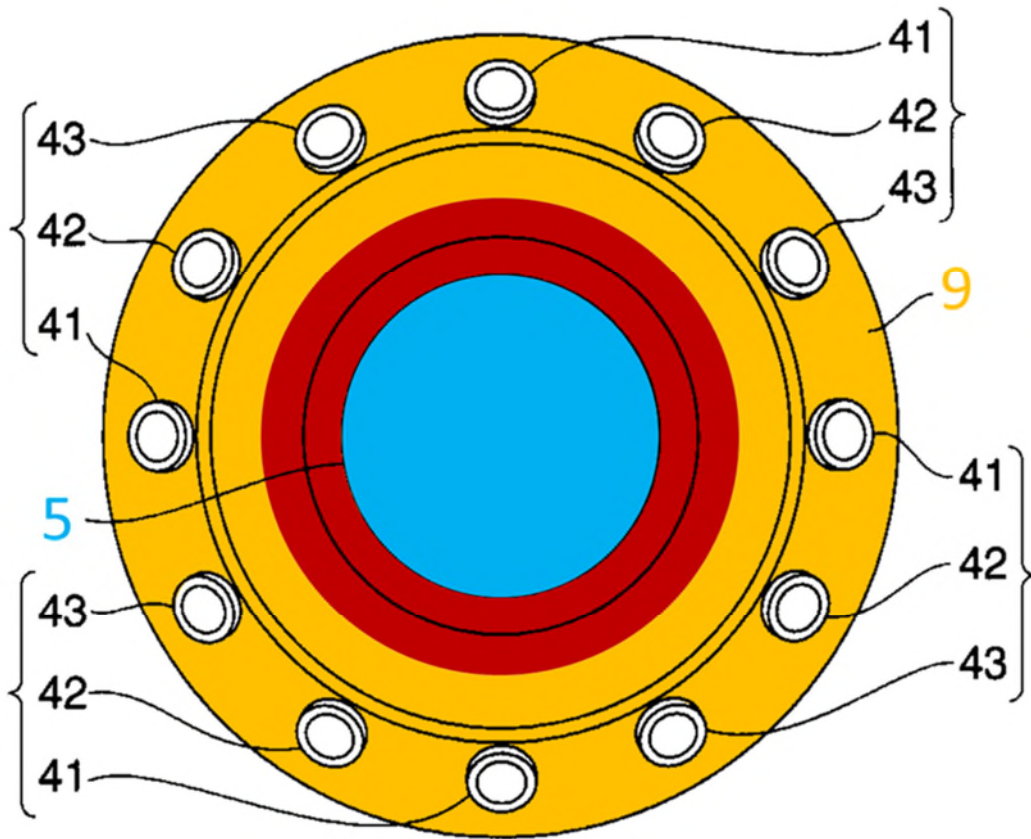
Olympus, Figure 1 (Annotated)

34. It is entirely possible, however, that the field of view of photodetector 24 is substantially wider than what is shown in Figure 1. For example, as shown below, the field of view of photodetector 24 could be (and likely would be) greater than the image formation lens 23, as shown in the second annotated Figure 1, and annotated Figure 13, below. Annotated Figure 1 shows the cross-sectional view, while annotated Figure 13 shows a top-down view of the housing 9 (shaded in gold

in both figures). As a result, as shown by the area shaded red in both annotated figures 1 and 13, a significant part of the field of view of photodetector 24 would be obstructed by the housing 9.



Olympus, Figure 1 (Annotated)



Olympus, Figure 13 (Annotated)

35. Thus, it is my opinion that Olympus does not disclose a camera having a field of view unobstructed by a housing.