**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ALABAMA
NORTHEASTERN DIVISION**

BERTHOLD DETECTION SYSTEMS GMBH, Plaintiff, v. HELLMA GMBH & CO. KG, and THOMAS SAHIRI, Defendants.	)	CIVIL ACTION NO. ____________ DEMAND FOR JURY TRIAL

COMPLAINT FOR DECLARATORY JUDGMENT OF PATENT NONINFRINGEMENT

Plaintiff Berthold Detection Systems GmbH ("Berthold") files this Complaint for Declaratory Judgment of Patent Noninfringement against Defendants Hellma Gmbh & Co. KG and Thomas Sahiri (together "Hellma"), and to support its Complaint alleges:

NATURE OF THE ACTION

1. This is an action under the Declaratory Judgment Act, 28 U.S.C. §§ 2201 and 2202 and the United States Patent Act, 35 U.S.C. § 1 *et seq* resulting from Hellma stating Berthold is a patent infringer and demanding Berthold cease and desist its activities or sign a license and pay Hellma a substantial license fee. No State court shall have any jurisdiction over any claim for relief arising under

the Patent Act. This action therefore involves non-frivolous and exclusively federal claims that could be brought by the defendants in a coercive action

2. Berthold seeks a declaration that it, its affiliates, and its customers utilizing Berthold technology infringe no valid and asserted claim of U.S. Patent No. 7,483,138 ("'138 Patent"). A true and correct copy of the patent is attached as Exhibit A.

PARTIES

3. Berthold is a German limited liability company with a principal place of business at Bleichstr. 56-68, 75173 Pforzheim, Germany.

4. Berthold owns and develops technologies involving analysis of the production and emission of light by living organisms (bioluminescence) and chemical reactions (chemiluminescence). It manufactures sophisticated instruments for scientific and medical use including the Colibri Microvolume Spectrometer ("Colibri"), a compact standalone instrument to measure the properties of particular ranges of light passing through test samples.

5. Berthold is an FDA registered manufacturer whose US agent operates in this judicial district at Titertek Instruments Inc., 5838 Research Park Blvd NW, Ste. 100, Huntsville, Alabama 35806. Titertek is a Berthold affiliate and its exclusive US sales representative.

6. Upon information and belief, Hellma is a German limited partnership with a sole general partner that is a limited liability company. The USPTO Patent Assignment Abstract of Title states Hellma GMBH & Co. KG is a co-owner by assignment of the right, title and interest of the '138 Patent with a principal place of business at Klosterrunsstrasse 5, 79379 Müllheim, Germany (last accessed June 19 2013). Hellma may also have a business affiliate or representative in the United States.

7. The last residence of Thomas Sahiri known to Berthold is shown in the USPTO Patent Assignment Abstract of Title which states Mr. Sahiri is a co-owner by assignment of the right, title and interest of the '138 Patent residing at Wehrlestrasse 33, Munich, Germany 81679. A true and correct copy is attached as Exhibit B (last accessed June 21 2013). Upon information and belief, he no longer resides in Germany.

JURISDICTION AND VENUE

8. This Court has jurisdiction over the subject matter of this action under 28 U.S.C. §§ 1331 and 1338, and the Declaratory Judgment Act, 28 U.S.C. §§ 2201 and 2202 based on federal question jurisdiction.

9. This court has personal jurisdiction over the Defendants under Alabama's long-arm statute in that Hellma has an intent or purpose to serve the

Alabama market with products made under the '138 Patent. Defendants' allegations that Berthold is a patent infringer which must cease and desist use of a United States patent, or take a license under it, are directed against Berthold's only American agent and sales representative which is in Alabama.

10. Venue is proper in this Court under 28 U.S.C. §§ 1391.

CEASE & DESIST AND LICENSE DEMANDS AGAINST BERTHOLD

11. Russell F. Behjatnia of the firm Law Offices of Russell F. Behjatnia, sent a letter dated March 28, 2013 to Berthold Detection Systems GmbH, to the attention of Dr. Anselm Berthold and Berthold Breitkopf in Pforzheim, Germany. The letter was "on behalf of my clients, the owners of the United States Patent number US 7,483 ,138 B2." A true and correct copy of the letter is attached as Exhibit C.

12. Hellma and Berthold are competitors.

13. The letter suggests that the Colibri uses the '138 Patent and demands an explanation of what entitles Berthold to use it. Without such entitlement, the letter says "we are placing [you] on notice to immediately cease and desist use of any information or claim protected by my client's Patent number US 7,483,138 B2."

14. After preliminary responses and a review of the '138 Patent, Michael C. Bartol, US patent counsel for Berthold, responded substantively and explained why Berthold did not infringe the patent. A true and correct copy of the letter dated April 29, 2013 is attached as Exhibit D.

15. If Hellma did not agree with Mr. Bartol's analysis, the April 29 letter requested:

> ...please provide us a claim chart listing each element of claim 1 and adjacent to it a description of the corresponding structure of the Colibri. Please include in the chart or separately an explanation of how you believe the particular structure you have identified meets the functional requirements of the corresponding claim element. Please also provide us with part descriptions, drawings, photographs, etc., which illustrate the exact structure of the Colibri that you believe meets the claim elements so that we may fully understand your position.

16. Hellma responded by counsel in a letter dated May 30, 2013 that "We have reviewed your response together with the available technical documentation thoroughly and are convinced that the Colibri Microvolume Spectrophotometer (Colibri) of your client is infringing US Patent No. 7,483,138." A true and complete copy without enclosure is attached as Exhibit E.

17. In the May 30 letter, Hellma demanded that Berthold stop using technology covered by the '183 Patent as they interpreted its claims, or alternatively enter into a license of the patent. Enclosed with the May 30, 2013 letter was a draft license agreement marked "CONFIDENTIAL & WITHOUT

PREJUDICE" and "SUBJECT TO CONTRACT" which requires a substantial payment from Berthold. A copy of the draft will be filed of record if procedures are approved by the Court to protect its claimed confidentiality, or as otherwise ordered.

18. Hellma did not provide a claim chart and other materials as requested.

19. On June 11, 2013, Mr. Bartol sent a letter further explaining why the Colibri does not infringe the '138 Patent. Among other issues, it discusses Hellma's rewording of claim language and failure to explain what in the Colibri produced the light "deflecting" claimed in the patent. A true and correct copy of the letter is attached as Exhibit F.

20. The '138 Patent has 99 instances of the words "deflection," "deflecting," "deflected," "deflects" and "deflect."

21. Hellma has not responded to the June 11 letter.

22. Hellma's assertion that the Colibri infringes the '138 Patent, and its demand that Berthold cease and desist the asserted use of the patent embodied in the Colibri or take a burdensome license, create an actual case or controversy whether Berthold, its affiliates, and customers are infringing any valid claim of the patent.

23. Hellma's statements show there is a substantial controversy, between parties having adverse legal interests, of sufficient immediacy and reality to warrant issuing a declaratory judgment.

24. Berthold continues to produce and market the Colibri that Hellma accuses as infringing the '138 Patent.

DECLARATION OF NONINFRINGEMENT

25. Paragraphs 1-24 are incorporated by reference as if fully restated.

26. Hellma asserts that Berthold's Colibri infringes Claim 1 of the '138 Patent.

27. Berthold's technology as used by Berthold and embodied in the Colibri infringe no valid and asserted claim of the '138 Patent because Berthold's technology does not satisfy all the limitations of those claims.

28. Berthold's technology infringes no valid and asserted claim of the '138 Patent because Berthold possesses all rights required to practice its technology.

29. Based on Hellma's statements and demands against Berthold, an actual case or controversy exists whether Berthold, its affiliates, and customers infringe any valid or enforceable claim of the '138 Patent, and Berthold is entitled

to a declaration it, its affiliates, and its customers infringe no valid claim of the patent.

JURY DEMAND

Berthold demands a jury on all issues so triable.

PRAYER FOR RELIEF

WHEREFORE, Berthold respectfully requests the following relief:

A. A judgment that Berthold, its affiliates, and customers utilizing Berthold technology as embodied in the Colibri infringe no valid claim of the '138 Patent;

B. A finding that this is an exceptional case under 35 U.S.C. § 285, entitling Berthold to be awarded the attorney fees, costs, and expenses it incurs in prosecuting this action;

C. Such further necessary or proper relief as the Court may deem just and proper, after reasonable notice and hearing, against Hellma.

Dated: June 21, 2013

Respectfully submitted,

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US007483138B2

(12) **United States Patent**
Sahiri et al.

(10) **Patent No.: US 7,483,138 B2**
(45) **Date of Patent: Jan. 27, 2009**

(54) **DEVICE FOR ANALYSIS OR ABSORPTION MEASUREMENT ON A SMALL AMOUNT OF LIQUID**

(75) Inventors: **Thomas Sahiri**, Wehriestrasse 33, Munchen (DE) 81679; **Holm Kandler**, Auggen (DE)

(73) Assignees: **Hellma GmbH & Co. KG**, Mullheim (DE); **Thomas Sahiri**, Munich (DE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **11/995,332**

(22) PCT Filed: **Jul. 12, 2006**

(86) PCT No.: **PCT/EP2006/006808**

§ 371 (c)(1),
(2), (4) Date: **Jan. 11, 2008**

(87) PCT Pub. No.: **WO2007/017035**

PCT Pub. Date: **Feb. 15, 2007**

(65) **Prior Publication Data**

US 2008/0204755 A1 Aug. 28, 2008

(30) **Foreign Application Priority Data**

Aug. 5, 2005 (DE) 10 2005 036 898

(51) **Int. Cl.**
G01N 21/00 (2006.01)
(52) **U.S. Cl.** 356/432; 356/246
(58) **Field of Classification Search** 356/432, 356/246
See application file for complete search history.

(56) **References Cited**

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Primary Examiner—Roy M Punnoose
(74) *Attorney, Agent, or Firm*—Volpe and Koenig, PC

(57) **ABSTRACT**

A device (1) for analysis of absorption measurement on small amounts, for example on a drop or droplet of a liquid medium (2) using light (2) is provided, with an upper planar location (4) for the application or dropping of the medium (2), a light entry (5) in the housing (6) arranged beneath the location surface or receiving position (4) and a first device (7) in the light beam behind the light entry (5) for deflection of the light upwards to the receiving position (4) where a detachably mounted reflector (8) is also located. The device (7) for deflecting the light beam is designed such that the direction of the optical axis of the deflected light beam is oriented upwards toward the middle (M) of the device (1) and the inclined position of the optical axis of the light beam with regard to the device mid-point (M) is arranged to be directed at the position of the reflector (8) through which the longitudinal median (M) between the light entry (5) and the light exit from the device (1) extends. The height of the assembly of the device (1) relative to such a device in which the light is first deflected about a right angle and only then after a further direction change is directed at the receiving position (4) or the sample, is correspondingly lower.

18 Claims, 2 Drawing Sheets

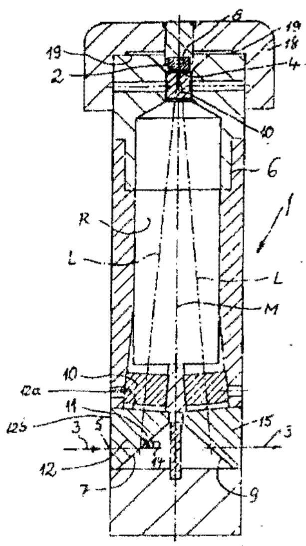

EXHIBIT A

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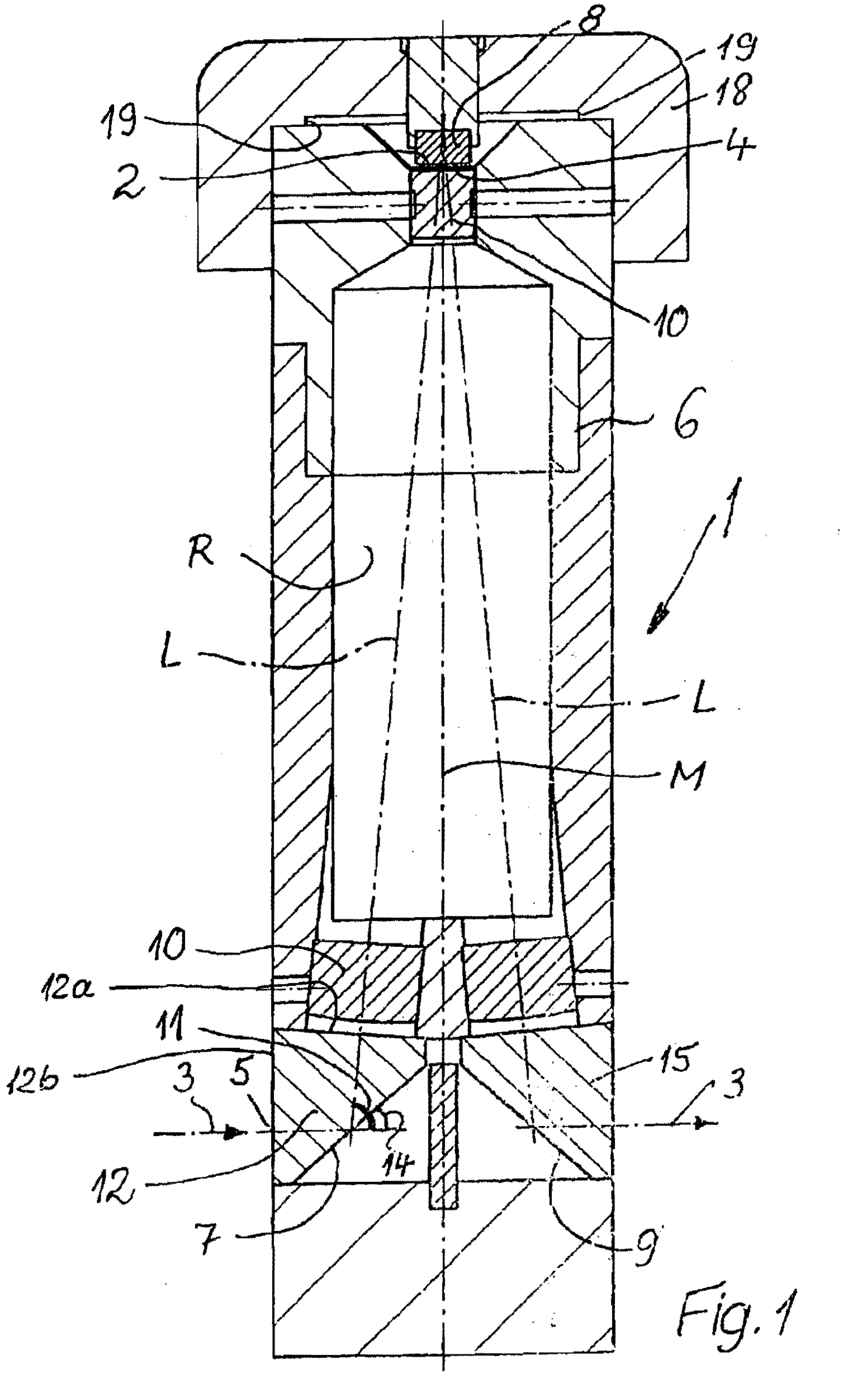

Fig. 1

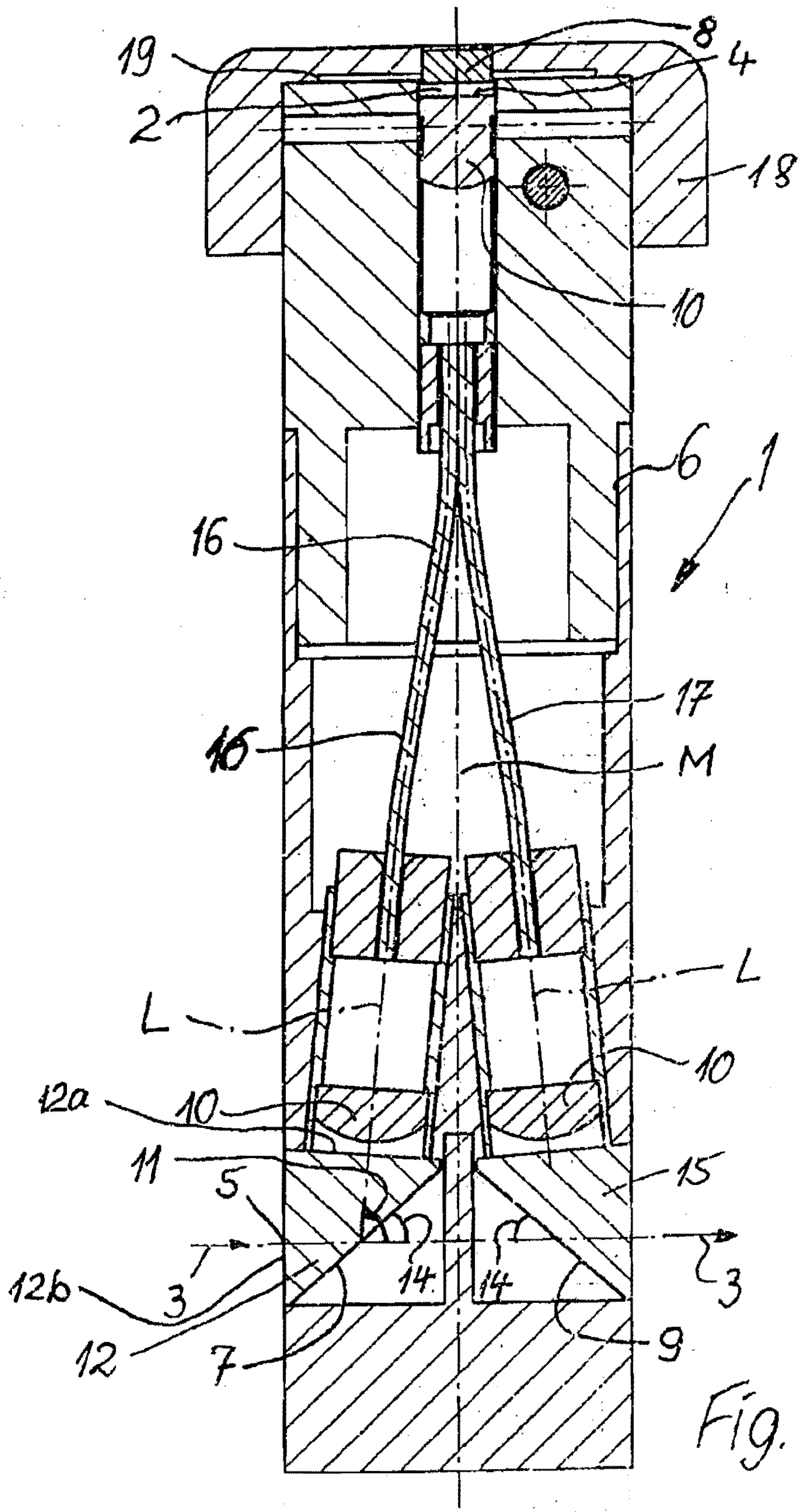

Fig. 2

DEVICE FOR ANALYSIS OR ABSORPTION MEASUREMENT ON A SMALL AMOUNT OF LIQUID

BACKGROUND

The invention relates to a device for the analysis or absorption measurement on a small amount, for example, on a droplet of a liquid medium with the help of light, which is guided through the medium and can then be detected or analyzed with a photometer, spectrophotometer, fluorometer, or spectrofluorometer, wherein the device has, in the position of use, an upper planar receiving location for the deposition or dropping of the medium, a light entry located, in the position of use, underneath the receiving location, in its housing, and a first device located in the beam path behind the light entry for deflecting the light upward to the receiving location and a reflector that can be mounted detachably above the receiving location and that has a defined distance from the receiving location in its position of use and is filled or can be filled by the medium at least in the area of the light passage, wherein a second device for deflecting the light coming from the reflector toward a detector is provided.

Such a device is described in the German Patent Application 10 2004 023 178.8 and has proven itself in practice. However, it has been shown that the provided light guidance, in which the optical axis of the light beam is deflected upward perpendicular to its direction provided at the entry to the device and then is guided to the actual measurement location, results in an overall height that is unfavorable for many applications.

SUMMARY

Therefore, there is the objective of providing a device of the type defined above, in which its advantages, placing small sample amounts of a liquid medium in a simple way onto a measurement location and being able to clean reliably and easily after the measurement, are maintained and, nevertheless, the overall height can be reduced.

To meet this objective, it is provided, for the device defined above, that the first device arranged at the light entry is constructed for deflecting the light beam, so that the resulting direction of the optical axis of the deflected light beam is oriented upwards and at an angle to the middle of the device and the inclined position of the optical axis is arranged relative to the device middle, so that the optical axis of the light beam or light beam bundle without or with the help of at least one optical element is directed toward the position of the reflector, through which the longitudinal middle extends between the light entry and the light exit of the device.

Through this angled position of the light beam bundle through its first deflection, a clearly lower overall height results than when the light beam bundle is first deflected by 90° and only then oriented toward the middle of the device and the reflector, because the distance of the reflector from the light entry can be smaller, in order, nevertheless, to be intersected by the light beam at the "light spot," namely at the receiving position for the sample. For this solution, the knowledge is required that for deflecting the light, a typical right-angle prism is not to be used for deflecting the light.

It is especially advantageous when the light beam reaches the reflector without an optical element, because then the expense for a corresponding optical element, for example, for an optical waveguide, can be spared.

However, it is also possible that at least one lens and/or one prism and/or one optical waveguide is provided as an optical

element for the deflected light beam to the reflector and then from the reflector to the light exit or to a second device located at the light exit for deflecting the light beam. Such an arrangement has the advantage of better and more precise light guidance.

The already mentioned alternatives, according to which the light beam runs without guiding out from the deflection or redirected to the receiving position, can be used, first, if it has a correspondingly small divergence or convergence or runs at least through a convex lens.

It can be useful if an optical element is provided as a window and/or for bundling the light beam, for example, a convex lens, before and/or after the entry of the deflected light beam into the open space crossed by it or into an optical waveguide.

An especially advantageous construction of the invention can be provided in that the optical axis of the light beam extends before and/or at the light entry into the housing horizontally and that the first device for deflecting the light beam, whose optical axis is deflected upward by less than 90°, especially by approximately 80° to 89°, preferably by approximately 85°. Instead of the right-angle deflection, relative to the original direction of the optical axis, a smaller deflection is performed, so that the deflected beam from the deflection point is directed at an angle to this middle relative to the longitudinal middle of the housing of the device, in order to be directed practically directly to the position of the device for correct alignment of the deflection and also, if necessary, with the help of the already mentioned optical elements, where the sample is located and is to be transited by the light. Deflection first by a right angle and then another deflection in the direction to the sample with corresponding expense and resulting larger overall height is to be avoided.

A structurally simple construction of the invention can be provided in that, in the region of the light entry, as a first device for deflection, a deflection prism or a deflection mirror is provided, whose reflective surface has an angle less than 45° relative to the optical axis of the incident light beam. By changing the angular position of the reflective surface of the deflection prism or the deflection mirror from the typical 45° angular position, the deflection of the light beam deviating from a right angle according to the invention can be implemented very easily.

Here, on the prism, the surface, through which the light beam exits after its deflection, can be oriented perpendicular to this deflected light beam or to its optical axis, in order to allow the least distorted light exit possible and to form an angle less than 90°, for example, approximately 80° to 89°, preferably approximately 85°, with a prism surface located on the light entry. Thus, for example, the prism surface at the light entry can run exactly vertical, in order to receive a horizontally incoming light beam, and nevertheless the deflection of the light beam according to the invention by less than 90° can then be implemented by this prism.

At the light exit, as a second device for deflection, a deflection prism or deflection mirror can be provided and the second device can be arranged mirror-symmetric to the first device between the entry and exit, so that the optical axis of an angled light beam coming from the reflector runs horizontally on or behind the light exit.

Additional constructions of the invention are the subject matter of claims 9 to 18. This involves, in part, features that are also provided in the device according to DE 10 2004 023 178.8 and that have the advantages described there. Here, the construction according to claim 11 is especially favorable, through which the necessary amount of the sample can be held especially small.

Primarily for the combination of individual or several of the features and measures described above, a device is produced, for which the medium to be examined can be deposited or dropped also in very small and minimal amounts onto an essentially horizontal surface, wherein this receiving position is then preferably crossed twice by the light. This can happen on the way to and from the reflector, wherein a correspondingly large measurement length is produced. Simultaneously, the total overall height of the device is reduced through the skillful light guidance, in which the light beam is directed at an angle to the sample directly after its entry.

Because the medium can be deposited onto an upper receiving location, no special care and no special precautions need to be taken to prevent negative effects due to gravity. Instead, gravity even helps to hold the medium in its position, in which the measurement is to take place. It is sufficient to remove the detachable reflector, to deposit the sample, and to move the reflector back into its position of use, in order to then be able to perform the measurement. Dropping a sample, for example, with the help of a pipette, is a process that can be carried out very easily.

The reflector can be a mirror or a reflective prism and can touch the sample in the position of use with no spacing. The light effectively passes through the sample correspondingly and is deflected back from the reflector, in order to deflect toward the actual detector via the second device for deflection. The measurement path through the sample can be twice as large as the distance of the receiving surface from the surface of the reflector and the light can cover this distance twice, as already explained above.

For a constant accuracy of the measurements and for avoiding changes to the measurement conditions between the individual measurements, as well as relative to reference measurements, it is especially useful when the reflector that can be placed on top or mounted detachably or a cover holding it is locked in rotation and centered relative to the device and its housing in the position of use. In this way it is guaranteed that it is always mounted in the same position relative to the device and its housing and thus also to the receiving position, after a sample was deposited. The appropriate reflection conditions match accordingly.

Here, different structural possibilities are present, which guarantee rotational locking, although the reflector can be removed from its position of use.

So that the reflector obtains the predetermined distance to the receiving position reproducibly in the position of use, this distance can be fixed by at least one spacer between the reflector or cover and housing or by a stop. Thus, for a user there is not the necessity of taking precautions for maintaining the predetermined distance when setting the reflector or the cover with the reflector on the device in its position of use. Also, the construction of the spacer or a stop can be solved structurally in different ways. Here, under certain circumstances, it is even conceivable that the spacer and the holder for the rotational locking of the reflector are combined with each other.

Indeed, the radiation of light onto the device can take place arbitrarily and the detection can also interact with the light exit from the device in a suitable way, wherein arbitrary measurement devices can be used.

It is especially useful, however, when the device has the outer dimensions of an optical cell that can be fitted into a photometer, spectrophotometer, fluorometer, or spectrofluorometer and that can be pumped with light and when the devices for light feeding or light deflection arranged in the interior of the device are arranged in the position of the device, at which for typical optical cells, entry and exit win-

dows for the light used for measurement, wherein the first device for light deflection deflects the light incoming from the photometer to the receiving surface and the second device for light deflection deflects the light coming back from the measurement position to the detector. Through skillful selection of the dimensions of the device according to the invention, this can be inserted into common photometers, spectrophotometers, fluorometers, or spectrofluorometers, in order to also be able to use very small samples of a medium in terms of amount for measurement. This primarily considerably reduces the investment and installation costs.

In this way, the light entry and light exit correspond to those of a conventional optical cell, so that feeding of the light and also its detection after passing through the sample can be performed very easily primarily in corresponding, already existing measurement devices.

For example, the outer dimensions of the cross section of the device can correspond to those of a standard optical cell and can equal, in particular, 12.5 millimeters by 12.5 millimeters.

It should also be mentioned that the light beam coming back out of the device can be aligned with the incoming light beam or can enclose a right angle with this incoming light beam. The latter is useful primarily in fluorometers or spectrofluorometers.

Primarily for the combination of individual or several of the features and measures described above, a device defined above is produced, which allows simple handling and an examination also of very small amounts of a liquid medium independent of its viscosity. Media of relatively high viscosity can also be easily examined, because it can be held without a problem on the essentially horizontal receiving surface. Furthermore, the cleaning after successful measurement is very easy and can be performed, for example, with the help of optical cleaning cloths or with pads. If necessary, typical cleaning means can be used. Here it is preferred that the measurement location charged by the examined medium is very easy to access, wherein the device can even remain in the measurement device.

Overall, a device is produced, which can be used primarily in a construction with optical cell-like dimensions in most commercially available measurement devices and in this way can also be used in older measurement devices without modification. In this way, the device can have an optimized and reduced overall height due to the favorable light guidance, that is, the overall height can have an overall height that is, for example, approximately 5% to approximately 20% or 25% smaller relative to the device shown in DE 10 2004 023 178.8. Reference measurement, sample measurement, and cleaning can be performed easily with less expense and without significant time loss.

BRIEF DESCRIPTION OF THE DRAWINGS

Below, embodiments of the invention are described in more detail with reference to the drawing. Shown, in part, in schematic view:

FIG. 1 a longitudinal section view of a device according to the invention with a housing, in which a light beam enters horizontally and is deflected upward at an angle by a first device, wherein an upper planar receiving position is provided for the deposition of the medium to be examined, above which a reflector can be mounted detachably, from which the light reflects back to a second device for further deflecting the light to outside of the device, wherein the light radiates within the housing of the device essentially through a free space, and also

FIG. 2 a view corresponding to FIG. 1 for a modified embodiment, in which the light is guided through optical waveguides within the housing of the device over a large part of the height.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the following description, parts of the different embodiments matching in terms of their function receive matching reference numbers even for modified shaping.

A device designated overall with **1**, whose housing **6** and thus also its housing contents are shown in longitudinal section in FIGS. **1** and **2**, is used for the analysis or absorption measurement of very small amounts, for example, on a droplet or a fraction of a droplet of a liquid medium **2** with the help of light symbolized by arrows **3**, wherein the optical axis of a corresponding light beam is indicated by dash-dot lines L running at an angle to the middle M.

This light is guided through the medium **2** and then detected or analyzed in a known way with a photometer, spectrophotometer, fluorometer, or spectrofluorometer. Here, both embodiments show that the device **1** has an upper planar essentially horizontal and largely flat receiving position **4** for depositing or dropping the medium **2** in the position of use, a horizontally oriented light entry **5** located underneath the receiving position **4** in its housing **6** in the position of use, and a first device **7** located behind the light entry **5** in the beam path for deflecting the light upward to the receiving position **4**, and also a reflector **8** that can be mounted detachably above the receiving position **4**.

In this way, the reflector **8** has, in the position of use, a defined distance from the receiving position **4**, in order to produce a consistently precise measurement path for the light. This distance is filled or can be filled by the medium **2** in the region of the light passage.

Furthermore, the device **1** has a second device **9** for deflecting the light coming from the reflector **8** to a deflector, which is not shown in more detail in FIGS. **1** and **2**.

The first device **7** arranged at the light entry **5** for deflecting the light beam in two embodiments is constructed so that the resulting direction of the optical axis—that is, the line L—of the deflected light beam is oriented at an angle upward to the middle of the device **1**, wherein the angled position of the optical axis is arranged relative to the device middle M, so that the optical axis of the light beam or light beam bundle is directed without (FIG. **1**) or with the help of an optical element (FIG. **2**) toward the position of the reflector **8**, through which, for example, the longitudinal middle M of the device **1** extends between the light entry **5** and the light exit. The light is deflected practically on the shortest path to the receiving position **4** and the sample, whether it is led through free space within the housing **6** or through an optical element, which can be, according to FIG. **2**, an optical waveguide **16**.

Here, one recognizes in both figures that before and after the entry of the deflected light beam into the free space (FIG. **1**) traversed by it or into an optical waveguide **9**, an optical element is provided as a window and/or for bundling the light beam, for example, a convex lens **10**. In this way, the light beam can be better bundled and directed more precisely onto the sample. In both embodiments, the optical axis of the light beam **3** runs horizontally before and at the light entry **5** into the housing **6** and the first device **7** for deflecting the light beam deflects its optical axis L by less than 90°, for example, by approximately 85° upward. This deflection angle is indicated with the reference number **11** in the figures. Here, in the region of the light entry **5**, as a first device **7** for deflection, a

deflection prism **12** or optionally also a deflection mirror is provided, wherein each reflective surface **7** has an angle **14** less than 45° relative to the optical axis of the incident light beam. The deviation of this angle **14** from 45° is half as large as the deviation of the angle **11** from 90°.

On the prism **12** is the surface **12***a*, through which the light beam exits after deflection upward at an angle, oriented at a right angle to the optical axis L of this deflected light beam, as is easy to see in both figures. Because the prism surface **12***b* located on the light entry is arranged perpendicular to the incoming light beam **3** and thus exactly vertical, an angle less than 90°, whose magnitude here corresponds to that of the angle **11**, is produced between the prism surface **12***a* and this prism surface **12***b* on the light entry **5**.

At the light exit there is, in turn, as a second device **9** for deflecting the light beam coming from the sample and running at an angle symmetric to the middle M, a deflection prism **15**—or optionally a deflection mirror, wherein this second device **9** is arranged mirror-symmetric to the middle M of the device **1** between the entry and exit, so that the optical axis L of a light beam emerging from the reflector **8** and running at an angle to this second device **9** runs horizontally again at or behind the light exit, as can be seen in both figures. The optical axis of the deflected light beam thus runs after the deflection on the shortest possible path to the receiving position **4** or the sample located there and the reflector **8** arranged above, so that a correspondingly small overall height of the device **1** is enabled.

In both embodiments, it is provided that the receiving position **4** is constructed as a surface and is accessible from above. The medium **2** to be examined is held by gravity at this receiving position. Here, the receiving position **4** is dimensioned so large that the light running through to the reflector **8** and reflected back from this reflector passes twice through the receiving position **4** and through the medium. In this way, the measurement path through the sample formed by the medium **2** is twice as large as the distance of the receiving surface **4** from the surface of the reflector **8** and the light covers this distance twice. In this way, the measurement path is twice as large as the mentioned distance.

In the embodiment according to FIG. **1**, the light runs from the first device **7** after its deflection practically unhindered through an open space R within the housing **6** to the sample **2** and after reflection from the reflector **8** in the same way back to the second device **9**.

In the embodiment according to FIG. **2**, however, the light bundle is guided by the optical waveguides **16** and **17** and is therefore compacted in its cross section. Directly after the deflection and before the receiving position **4**, however, there is the already mentioned convex lens **10** bundling the light or a corresponding optical window, wherein such a convex lens **10** is then also provided in the reflected light in front of the second device **9**.

The receiving position **4** is lowered in both embodiments relative to the upper end side of the housing **6** covered by the reflector **8** or a cover **18** holding this reflector, so that the boundaries of this lowered section simultaneously limit the receiving position **4** and therefore contribute to the fact that a very small amount of a sample is already held and can be examined.

The reflector **8** can be a mirror or a reflective prism and can contact the sample of the medium **2** with no spacing in the position of use. As mentioned, the measurement path through the sample is then twice as large as the distance of the receiving position **4** from the surface of the reflector **8** and the light covers this distance twice for forming the total measurement path.

The reflector **8** that can be placed on top or mounted detachably or the cover **18** holding this reflector according to FIGS. **1** and **2** is locked in rotation and centered relative to the device **1** and its housing **6** in the position of use. The distance of the reflector **8** from the receiving position **4** is here fixed by the spacer **19** between the reflector **8** and housing **6** or—in both embodiments—between the cover **18** holding the reflector **8** and the housing **6**. Here, this spacer **19** can preferably rotate like a ring, in order to maintain a uniform distance.

The device **1** preferably has the outer dimensions of an optical cell, which can be fitted into a photometer, a spectrophotometer, fluorometer, or spectrofluorometer and which can be pumped by light, and the devices **7** and **9** arranged in the interior of the device **1** for deflecting light are here arranged at the position, at which for typical optical cells, entry and exit windows are provided for the light used for measurement. The first device **7** for deflecting light deflects the light radiating in from the photometer or the like to the receiving position **4**, while the second device **9** is used for deflecting the light coming back from this measurement position to the detector. The outer dimensions of the cross section of the device **1** correspond to those of a standard optical cell and equal, for example, 12.5 mm×12.5 mm.

Therefore, as can be seen in the figures, the optical axis L of the emerging light beam aligns with that of the incoming light beam **3**, but these two areas of the light beam could also enclose a right angle if the two devices **7** and **9** are rotated relative to each other accordingly.

The device **1** for the analysis or absorption measurement of a small amount, for example, of a drop or a droplet of a liquid medium **2** with the help of light **3** has an upper planar receiving position **4** for depositing or dropping the medium **2** and a light entry **5** located in the position of use underneath this receiving position or receiving surface **4** in the housing **6** and also, in the beam path behind this light entry **5**, a first device **7** for deflecting the light upward to the receiving position **4**, where a reflector **8** that can be mounted detachably is also located. Here, the device **7** for deflecting the light beam is constructed so that the direction of the optical axis of the deflected light beam is oriented upward and toward the middle M of the device **1** and the inclined position of the optical axis of the light beam is arranged relative to the device middle M so that it is directed toward the position of the reflector **8**, through which the longitudinal middle M runs between the light entry **5** and the light exit of the device **1**. The overall height of the device **1** can be correspondingly smaller than one, in which the light is first deflected by a right angle and only then is directed via another change in direction toward the receiving position or sample.

The invention claimed is:

1. Device (**1**) for the analysis or absorption measurement of a small amount of a liquid medium (**2**) with the help of light (**3**), which is guided through the medium (**2**) and then can be detected or analyzed with a photometer, spectrophotometer, fluorometer, or spectrofluorometer, the device (**1**) comprising an upper planar receiving position (**4**) for deposition or dropping of the medium (**2**) in a position of use, a light entry (**5**) located in the position of use underneath the receiving position (**4**) in a housing (**6**) and a first device (**7**) located in the beam path at the light entry (**5**) for deflecting the light upward toward the receiving position (**4**) and a reflector (**8**) that is mounted detachably above the receiving position (**4**) and that has, in a position of use, a defined spacing from the receiving position (**4**) that is filled or can be filled at least in a region of the light passage by the medium (**2**), wherein there is a second device (**9**) for deflecting the light coming from the reflector (**8**) toward a detector, the first device (**7**) arranged at the light

entry (**5**) is constructed for deflecting the light beam, so that a resulting direction of an optical axis of the deflected light beam is oriented upward and at an angle to a middle (M) of the device (**1**) and the angled position of the optical axis is here arranged relative to the device middle (M) so that the optical axis of the light beam is directed without or with the help of at least one optical element toward a position of the reflector (**8**), through which the longitudinal middle (M) extends between the light entry (**5**) and the light exit of the device (**1**).

2. Device according to claim **1**, wherein as the optical element for deflecting light beam toward the reflector (**8**) and then from the reflector (**8**) to the light exit or to a second device located at the light exit for deflecting the light beam, there is at least one of one lens, one prism or one optical waveguide (**16**; **17**).

3. Device according to claim **1**, wherein the light beam runs out from the deflection device unguided or undirected toward the receiving position (**4**).

4. Device according to claim **1**, wherein at least one of before or after the entry of the deflected light beam into the free space (R) traversed by the light beam or an optical waveguide (**9**) there is an optical element acting as at least one of a window or for bundling the light beam.

5. Device according to claim **1**, wherein the optical axis of the light beam (**3**) extends horizontally at least one of in front of or at the light entry (**5**) in the housing (**6**) and the first device (**7**) for deflecting the light beam deflects its optical axis (L) upward by less than 90°.

6. Device according to claim **1**, wherein in a region of the light entry (**5**), as the first device (**7**) for deflection, there is a deflection prism (**12**) or a deflection mirror, having a reflective surface (**13**) that has an angle (**14**) less than 45° relative to the optical axis of the incident light beam.

7. Device according to claim **6**, wherein on the prism (**12**), there is a surface (**12***a*), through which the light beam exits after the deflection, that is oriented perpendicular to the deflected light beam or to an optical axis (L) thereof and forms an angle less than 90° with a prism surface (**12***b*) located at the light entry (**5**).

8. Device according to claim **6**, wherein on the light exit, the second deflection device (**9**) comprises a deflection prism (**15**) or deflection mirror, and the second deflection device (**9**) is arranged mirror-symmetric to the middle (M) of the device (**1**) between the entry and exit, so that the optical axis (L) of a light beam emerging from the reflector (**8**) and extending at an angle extends horizontally at or behind the light exit.

9. Device according to claim **1**, wherein the receiving position (**4**) is accessible from above and the medium to be examined can be fixed or is held by gravity on the receiving position (**4**).

10. Device according to wherein the receiving position (**4**) is dimensioned so large that the light (**3**) running to the reflector (**8**) and reflected back from the reflector is guided at least once through the receiving position (**4**) and through the medium (**2**).

11. Device according to claim **1**, wherein the receiving position (**4**) has a lowered section relative to an upper end side of the housing (**6**) covered by the reflector (**8**) or a cover (**18**) and boundaries of the lowered section limit the receiving position (**4**).

12. Device according to claim **1**, wherein the reflector (**8**) is a mirror or a reflective prism and contacts the sample of the medium (**2**) without spacing in the position of use.

13. Device according to claim **1**, wherein the measurement path through the sample is twice as large as a distance of the

receiving position (4) from a surface of the reflector (8) and the light covers this distance twice for forming a total measurement path.

14. Device according to claim 1, wherein the reflector (8) can be placed or mounted detachably or a cover (18) holding the reflector is locked in rotation and centered relative to the device (1) and the housing (6) thereof in the position of use.

15. Device according to claim 1, wherein a distance of the reflector (8) from the receiving position (4) is fixed by at least one spacer (19), which is arranged between the reflector (8) or cover (18) and housing (6), or by at least one stop.

16. Device according to claim 1, wherein the device (1) has outer dimensions corresponding to an optical cell, which can be fitted into a photometer, spectrophotometer, fluorometer, or spectrofluorometer and which can be pumped by light, and the devices (7, 9) arranged in an interior of the device (1) for guiding or deflecting light are arranged at a position of the device (1), at which, for typical optical cells, entry and exit windows for the light (3) used for the measurement are provided, wherein the first deflection device (7) deflects the light radiating in from the photometer or the like to the receiving surface (4) and the second device (9) for light deflection deflects the light coming back from the measurement position to a detector.

17. Device according to claim 16, wherein the outer dimensions of a cross section of the device (1) correspond to those of a standard optical cell and equal, in particular, 12.5 mm×12.5 mm.

18. Device according to claim 16, wherein the optical axis (2) of the emerging light beam (3) aligns with that of the incoming light beam or encloses a right angle.

* * * * *

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Patent Assignment Abstract of Title

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Total Assignments: 2

Patent #: 7483139 **Issue Dt:** 01/27/2009 **Application #:** 11995332 **Filing Dt:** 01/11/2008

Publication #: 20080204755 **Pub Dt:** 08/28/2008

Inventors: Thomas Sahiri, Holm Kandler

Title: DEVICE FOR ANALYSIS OR ABSORPTION MEASUREMENT ON A SMALL AMOUNT OF LIQUID

Assignment: 1

Reel/Frame: 020352/0090 **Recorded:** 01/11/2008 **Pages:** 5

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignors: SAHIRI, THOMAS **Exec Dt:** 12/19/2007

KANDLER, HOLM **Exec Dt:** 12/17/2007

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Assignment: 2

Reel/Frame: 021986/0873 **Recorded:** 12/16/2008 **Pages:** 4

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignor: HELLMA GMBH & CO. KG **Exec Dt:** 12/10/2008

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EXHIBIT B

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March 28, 2013

Berthold Detection Systems GmbH
Dr. Anselm Berthold, Berthold Breitkopf
Bleichstr. 56 - 68
75173 Pforzheim
Germany

Re: Colibri Microvolume Spectrophotometer

Dear Dr. Berthold and Mr. Breitkopf:

I am contacting you on behalf of my clients, the owners of the United States Patent number US 7,483,138 B2, regarding the following matter:

The description in the brochure of your product Colibri Microvolume Spectrophotometer suggests that said product is utilizing the invention of my clients.

Clearly your instrument is an apparatus for the absorption measurement in a small quantity of liquid medium, e.g. a drop, by means of light, which is guided through the sample to allow the detection or analysis of the sample. The Colibri Microvolume Spectrophotometer is comprising an upper planar receiving position for deposit or dropping of the medium in a position of use. A light entry located in the position of use underneath the receiving position in a housing and a device located in the beam path at the light entry for deflecting the light upward toward the receiving position and a reflector that is mounted detachably above the receiving position. The instrument has, in a position of use, a defined spacing from the receiving position that is filled or can be filled at least in a region of the light passage by the medium wherein there is a device for deflecting the light coming from the reflector toward a detector.

Enclosed you will find a copy of US Patent issued to my client which allows you to verify that your apparatus is infringing the important first claim of the patent.

On behalf of my clients I am asking you to explain the facts or show prior rights that are allowing you to utilize the patent in the manner described. Absent any such rights, we are placing on notice to immediately cease and desist use of any information or claim protected by my client's Patent number US 7,483,138 B2.

EXHIBIT C

I am expecting your response by no later than April 15, 2013. Should we not receive your response, we shall assume that you will not be able to provide a satisfactory answer.

Sincerely yours,

Russell F. Behjatnia,
Attorney at Law

US007483138B2

(12) **United States Patent**
Sahiri et al.

(10) **Patent No.:** **US 7,483,138 B2**
(45) **Date of Patent:** **Jan. 27, 2009**

(54) **DEVICE FOR ANALYSIS OR ABSORPTION MEASUREMENT ON A SMALL AMOUNT OF LIQUID**

(75) Inventors: **Thomas Sahiri**, Wehriestrasse 33, Munchen (DE) 81679; **Holm Kandler**, Auggen (DE)

(73) Assignees: **Hellma GmbH & Co. KG**, Mullheim (DE); **Thomas Sahiri**, Munich (DE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(51) **Int. Cl.**
G01N 21/00 (2006.01)

(52) **U.S. Cl.** **356/432**; 356/246

(58) **Field of Classification Search** 356/432, 356/246

See application file for complete search history.

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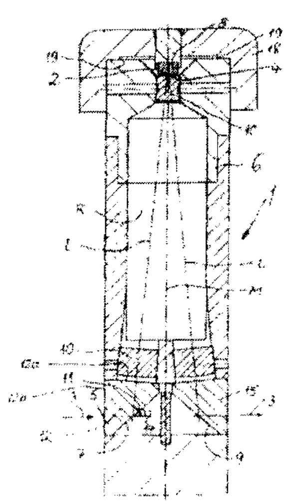
Primary Examiner—Roy M Punnoose
(74) *Attorney, Agent, or Firm*—Volpe and Koenig, PC

(57) **ABSTRACT**

A device (1) for analysis of absorption measurement on small amounts, for example on a drop or droplet of a liquid medium (2) using light (3) is provided, with an upper planar location (4) for the application or dropping of the medium (2), a light entry (5) in the housing (6) arranged beneath the location surface or receiving position (4) and a first device (7) in the light beam behind the light entry (5) for deflection of the light upwards to the receiving position (4) where a detachably mounted reflector (8) is also located. The device (7) for deflecting the light beam is designed such that the direction of the optical axis of the deflected light beam is oriented upwards toward the middle (M) of the device (1) and the inclined position of the optical axis of the light beam with regard to the device mid-point (M) is arranged to be directed at the position of the reflector (8) through which the longitudinal median (M) between the light entry (5) and the light exit from the device (1) extends. The height of the assembly of the device (1) relative to such a device in which the light is first deflected about a right angle and only then after a further direction change is directed at the receiving position (4) or the sample, is correspondingly lower.

18 Claims, 2 Drawing Sheets



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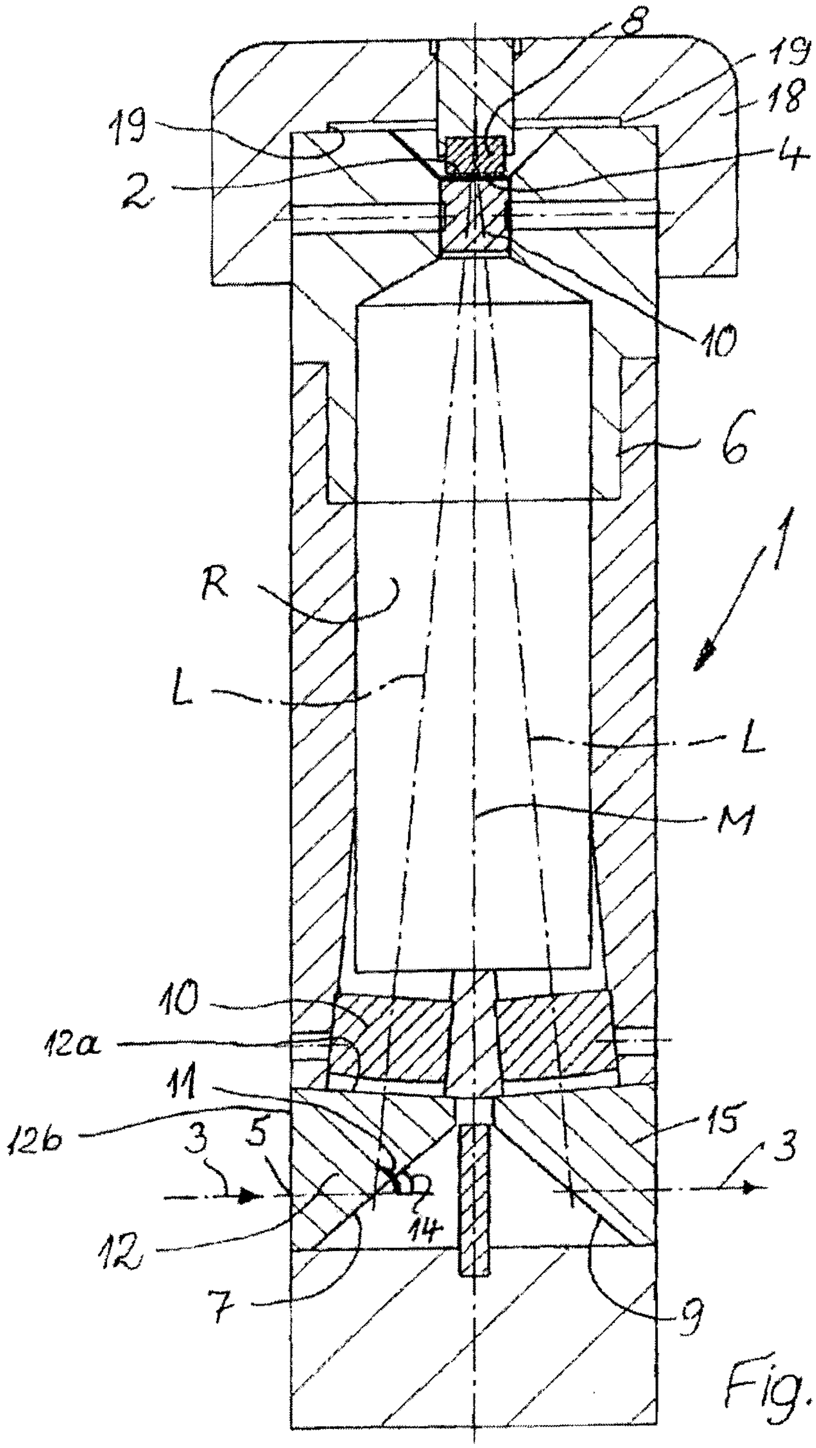


Fig. 1

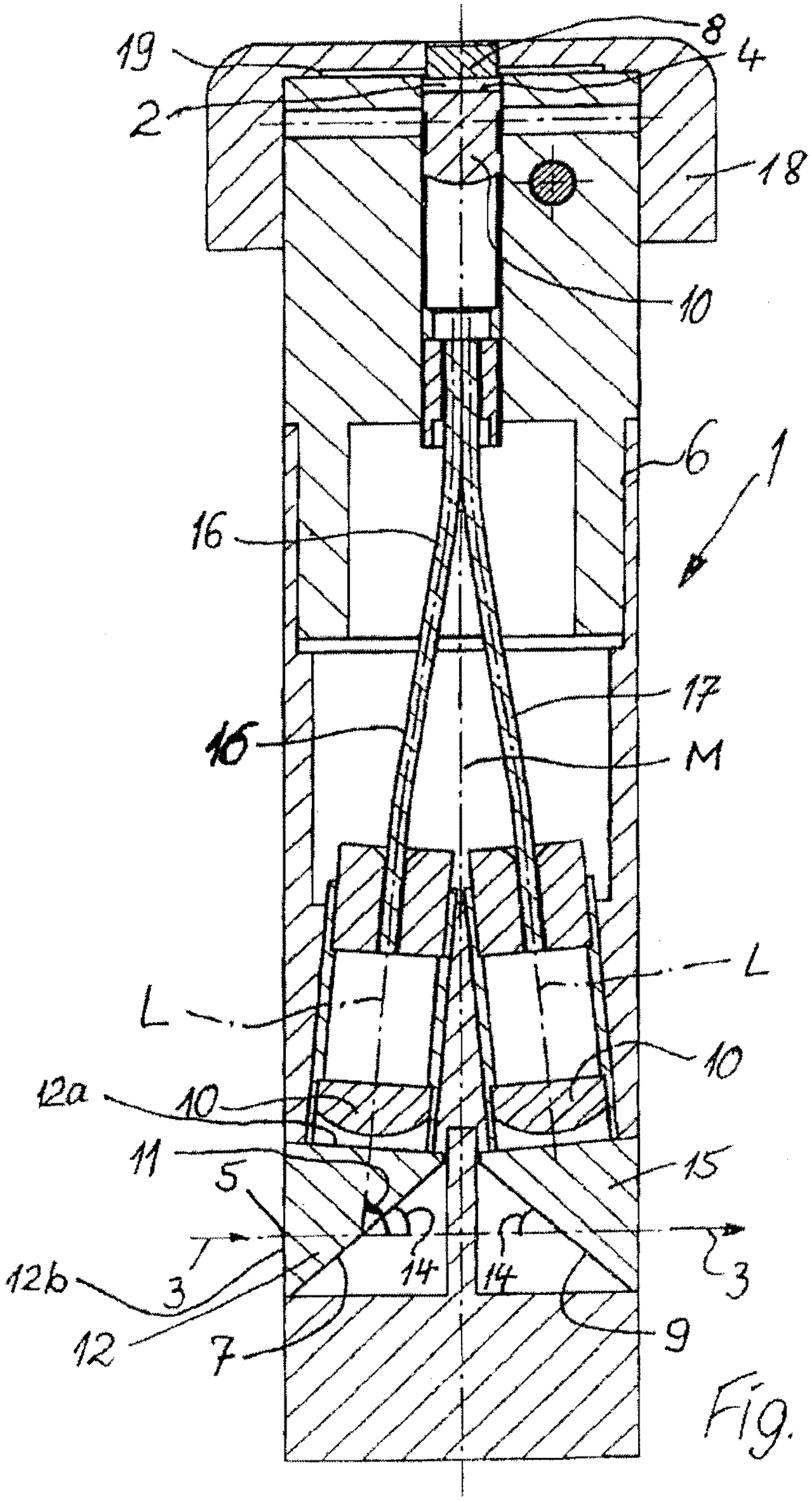


Fig. 2

DEVICE FOR ANALYSIS OR ABSORPTION MEASUREMENT ON A SMALL AMOUNT OF LIQUID

BACKGROUND

The invention relates to a device for the analysis or absorption measurement on a small amount, for example, on a droplet of a liquid medium with the help of light, which is guided through the medium and can then be detected or analyzed with a photometer, spectrophotometer, fluorometer, or spectrofluorometer, wherein the device has, in the position of use, an upper planar receiving location for the deposition or dropping of the medium, a light entry located, in the position of use, underneath the receiving location, in its housing, and a first device located in the beam path behind the light entry for deflecting the light upward to the receiving location and a reflector that can be mounted detachably above the receiving location and that has a defined distance from the receiving location in its position of use and is filled or can be filled by the medium at least in the area of the light passage, wherein a second device for deflecting the light coming from the reflector toward a detector is provided.

Such a device is described in the German Patent Application 10 2004 023 178.8 and has proven itself in practice. However, it has been shown that the provided light guidance, in which the optical axis of the light beam is deflected upward perpendicular to its direction provided at the entry to the device and then is guided to the actual measurement location, results in an overall height that is unfavorable for many applications.

SUMMARY

Therefore, there is the objective of providing a device of the type defined above, in which its advantages, placing small sample amounts of a liquid medium in a simple way onto a measurement location and being able to clean reliably and easily after the measurement, are maintained and, nevertheless, the overall height can be reduced.

To meet this objective, it is provided, for the device defined above, that the first device arranged at the light entry is constructed for deflecting the light beam, so that the resulting direction of the optical axis of the deflected light beam is oriented upwards and at an angle to the middle of the device and the inclined position of the optical axis is arranged relative to the device middle, so that the optical axis of the light beam or light beam bundle without or with the help of at least one optical element is directed toward the position of the reflector, through which the longitudinal middle extends between the light entry and the light exit of the device.

Through this angled position of the light beam bundle through its first deflection, a clearly lower overall height results than when the light beam bundle is first deflected by 90° and only then oriented toward the middle of the device and the reflector, because the distance of the reflector from the light entry can be smaller, in order, nevertheless, to be intersected by the light beam at the "light spot," namely at the receiving position for the sample. For this solution, the knowledge is required that for deflecting the light, a typical right-angle prism is not to be used for deflecting the light.

It is especially advantageous when the light beam reaches the reflector without an optical element, because then the expense for a corresponding optical element, for example, for an optical waveguide, can be spared.

However, it is also possible that at least one lens and/or one prism and/or one optical waveguide is provided as an optical element for the deflected light beam to the reflector and then from the reflector to the light exit or to a second device located at the light exit for deflecting the light beam. Such an arrangement has the advantage of better and more precise light guidance.

The already mentioned alternatives, according to which the light beam runs without guiding out from the deflection or redirected to the receiving position, can be used, first, if it has a correspondingly small divergence or convergence or runs at least through a convex lens.

It can be useful if an optical element is provided as a window and/or for bundling the light beam, for example, a convex lens, before and/or after the entry of the deflected light beam into the open space crossed by it or into an optical waveguide.

An especially advantageous construction of the invention can be provided in that the optical axis of the light beam extends before and/or at the light entry into the housing horizontally and that the first device for deflecting the light beam, whose optical axis is deflected upward by less than 90°, especially by approximately 80° to 89°, preferably by approximately 85°. Instead of the right-angle deflection, relative to the original direction of the optical axis, a smaller deflection is performed, so that the deflected beam from the deflection point is directed at an angle to this middle relative to the longitudinal middle of the housing of the device, in order to be directed practically directly to the position of the device for correct alignment of the deflection and also, if necessary, with the help of the already mentioned optical elements, where the sample is located and is to be transited by the light. Deflection first by a right angle and then another deflection in the direction to the sample with corresponding expense and resulting larger overall height is to be avoided.

A structurally simple construction of the invention can be provided in that, in the region of the light entry, as a first device for deflection, a deflection prism or a deflection mirror is provided, whose reflective surface has an angle less than 45° relative to the optical axis of the incident light beam. By changing the angular position of the reflective surface of the deflection prism or the deflection mirror from the typical 45° angular position, the deflection of the light beam deviating from a right angle according to the invention can be implemented very easily.

Here, on the prism, the surface, through which the light beam exits after its deflection, can be oriented perpendicular to this deflected light beam or to its optical axis, in order to allow the least distorted light exit possible and to form an angle less than 90°, for example, approximately 80° to 89°, preferably approximately 85°, with a prism surface located on the light entry. Thus, for example, the prism surface at the light entry can run exactly vertical, in order to receive a horizontally incoming light beam, and nevertheless the deflection of the light beam according to the invention by less than 90° can then be implemented by this prism.

At the light exit, as a second device for deflection, a deflection prism or deflection mirror can be provided and the second device can be arranged mirror-symmetric to the first device between the entry and exit, so that the optical axis of an angled light beam coming from the reflector runs horizontally on or behind the light exit.

Additional constructions of the invention are the subject matter of claims 9 to 18. This involves, in part, features that are also provided in the device according to DE 10 2004 023 178.8 and that have the advantages described there. Here, the construction according to claim 11 is especially favorable, through which the necessary amount of the sample can be held especially small.

Primarily for the combination of individual or several of the features and measures described above, a device is produced, for which the medium to be examined can be deposited or dropped also in very small and minimal amounts onto an essentially horizontal surface, wherein this receiving position is then preferably crossed twice by the light. This can happen on the way to and from the reflector, wherein a correspondingly large measurement length is produced. Simultaneously, the total overall height of the device is reduced through the skillful light guidance, in which the light beam is directed at an angle to the sample directly after its entry.

Because the medium can be deposited onto an upper receiving location, no special care and no special precautions need to be taken to prevent negative effects due to gravity. Instead, gravity even helps to hold the medium in its position, in which the measurement is to take place. It is sufficient to remove the detachable reflector, to deposit the sample, and to move the reflector back into its position of use, in order to then be able to perform the measurement. Dropping a sample, for example, with the help of a pipette, is a process that can be carried out very easily.

The reflector can be a mirror or a reflective prism and can touch the sample in the position of use with no spacing. The light effectively passes through the sample correspondingly and is deflected back from the reflector, in order to deflect toward the actual detector via the second device for deflection. The measurement path through the sample can be twice as large as the distance of the receiving surface from the surface of the reflector and the light can cover this distance twice, as already explained above.

For a constant accuracy of the measurements and for avoiding changes to the measurement conditions between the individual measurements, as well as relative to reference measurements, it is especially useful when the reflector that can be placed on top or mounted detachably or a cover holding it is locked in rotation and centered relative to the device and its housing in the position of use. In this way it is guaranteed that it is always mounted in the same position relative to the device and its housing and thus also to the receiving position, after a sample was deposited. The appropriate reflection conditions match accordingly.

Here, different structural possibilities are present, which guarantee rotational locking, although the reflector can be removed from its position of use.

So that the reflector obtains the predetermined distance to the receiving position reproducibly in the position of use, this distance can be fixed by at least one spacer between the reflector or cover and housing or by a stop. Thus, for a user there is not the necessity of taking precautions for maintaining the predetermined distance when setting the reflector or the cover with the reflector on the device in its position of use. Also, the construction of the spacer or a stop can be solved structurally in different ways. Here, under certain circumstances, it is even conceivable that the spacer and the holder for the rotational locking of the reflector are combined with each other.

Indeed, the radiation of light onto the device can take place arbitrarily and the detection can also interact with the light exit from the device in a suitable way, wherein arbitrary measurement devices can be used.

It is especially useful, however, when the device has the outer dimensions of an optical cell that can be fitted into a photometer, spectrophotometer, fluorometer, or spectrofluorometer and that can be pumped with light and when the devices for light feeding or light deflection arranged in the interior of the device are arranged in the position of the device, at which for typical optical cells, entry and exit windows for the light used for measurement, wherein the first device for light deflection deflects the light incoming from the photometer to the receiving surface and the second device for light deflection deflects the light coming back from the measurement position to the detector. Through skillful selection of the dimensions of the device according to the invention, this can be inserted into common photometers, spectrophotometers, fluorometers, or spectrofluorometers, in order to also be able to use very small samples of a medium in terms of amount for measurement. This primarily considerably reduces the investment and installation costs.

In this way, the light entry and light exit correspond to those of a conventional optical cell, so that feeding of the light and also its detection after passing through the sample can be performed very easily primarily in corresponding, already existing measurement devices.

For example, the outer dimensions of the cross section of the device can correspond to those of a standard optical cell and can equal, in particular, 12.5 millimeters by 12.5 millimeters.

It should also be mentioned that the light beam coming back out of the device can be aligned with the incoming light beam or can enclose a right angle with this incoming light beam. The latter is useful primarily in fluorometers or spectrofluorometers.

Primarily for the combination of individual or several of the features and measures described above, a device defined above is produced, which allows simple handling and an examination also of very small amounts of a liquid medium independent of its viscosity. Media of relatively high viscosity can also be easily examined, because it can be held without a problem on the essentially horizontal receiving surface. Furthermore, the cleaning after successful measurement is very easy and can be performed, for example, with the help of optical cleaning cloths or with pads. If necessary, typical cleaning means can be used. Here it is preferred that the measurement location charged by the examined medium is very easy to access, wherein the device can even remain in the measurement device.

Overall, a device is produced, which can be used primarily in a construction with optical cell-like dimensions in most commercially available measurement devices and in this way can also be used in older measurement devices without modification. In this way, the device can have an optimized and reduced overall height due to the favorable light guidance, that is, the overall height can have an overall height that is, for example, approximately 5% to approximately 20% or 25% smaller relative to the device shown in DE 10 2004 023 178.8. Reference measurement, sample measurement, and cleaning can be performed easily with less expense and without significant time loss.

BRIEF DESCRIPTION OF THE DRAWINGS

Below, embodiments of the invention are described in more detail with reference to the drawing. Shown, in part, in schematic view:

FIG. 1 a longitudinal section view of a device according to the invention with a housing, in which a light beam enters horizontally and is deflected upward at an angle by a first device, wherein an upper planar receiving position is provided for the deposition of the medium to be examined, above which a reflector can be mounted detachably, from which the light reflects back to a second device for further deflecting the light to outside of the device, wherein the light radiates within the housing of the device essentially through a free space, and also

FIG. 2 a view corresponding to FIG. 1 for a modified embodiment, in which the light is guided through optical waveguides within the housing of the device over a large part of the height.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the following description, parts of the different embodiments matching in terms of their function receive matching reference numbers even for modified shaping.

A device designated overall with **1**, whose housing **6** and thus also its housing contents are shown in longitudinal section in FIGS. **1** and **2**, is used for the analysis or absorption measurement of very small amounts, for example, on a droplet or a fraction of a droplet of a liquid medium **2** with the help of light symbolized by arrows **3**, wherein the optical axis of a corresponding light beam is indicated by dash-dot lines I running at an angle to the middle M.

This light is guided through the medium **2** and then detected or analyzed in a known way with a photometer, spectrophotometer, fluorometer, or spectrofluorometer. Here, both embodiments show that the device **1** has an upper planar essentially horizontal and largely flat receiving position **4** for depositing or dropping the medium **2** in the position of use, a horizontally oriented light entry **5** located underneath the receiving position **4** in its housing **6** in the position of use, and a first device **7** located behind the light entry **5** in the beam path for deflecting the light upward to the receiving position **4**, and also a reflector **8** that can be mounted detachably above the receiving position **4**.

In this way, the reflector **8** has, in the position of use, a defined distance from the receiving position **4**, in order to produce a consistently precise measurement path for the light. This distance is filled or can be filled by the medium **2** in the region of the light passage.

Furthermore, the device **1** has a second device **9** for deflecting the light coming from the reflector **8** to a deflector, which is not shown in more detail in FIGS. 1 and **2**.

The first device **7** arranged at the light entry **5** for deflecting the light beam in two embodiments is constructed so that the resulting direction of the optical axis—that is, the line I—of the deflected light beam is oriented at an angle upward to the middle of the device **1**, wherein the angled position of the optical axis is arranged relative to the device middle M, so that the optical axis of the light beam or light beam bundle is directed without (FIG. **1**) or with the help of an optical element (FIG. **2**) toward the position of the reflector **8**, through which, for example, the longitudinal middle M of the device **1** extends between the light entry **5** and the light exit. The light is deflected practically on the shortest path to the receiving position **4** and the sample, whether it is led through free space within the housing **6** or through an optical element, which can be, according to FIG. **2**, an optical waveguide **16**.

Here, one recognizes in both figures that before and after the entry of the deflected light beam into the free space (FIG. **1**) traversed by it or into an optical waveguide **9**, an optical element is provided as a window and/or for bundling the light beam, for example, a convex lens **10**. In this way, the light beam can be better bundled and directed more precisely onto the sample. In both embodiments, the optical axis of the light beam **3** runs horizontally before and at the light entry **5** into the housing **6** and the first device **7** for deflecting the light beam deflects its optical axis I by less than 90°, for example, by approximately 85° upward. This deflection angle is indicated with the reference number **11** in the figures. Here, in the region of the light entry **5**, as a first device **7** for deflection, a deflection prism **12** or optionally also a deflection mirror is provided, wherein each reflective surface **7** has an angle **14** less than 45° relative to the optical axis of the incident light beam. The deviation of this angle **14** from 45° is half as large as the deviation of the angle **11** from 90°.

On the prism **12** is the surface **12***a*, through which the light beam exits after deflection upward at an angle, oriented at a right angle to the optical axis I of this deflected light beam, as is easy to see in both figures. Because the prism surface **12***b* located on the light entry is arranged perpendicular to the incoming light beam **3** and thus exactly vertical, an angle less than 90°, whose magnitude here corresponds to that of the angle **11**, is produced between the prism surface **12***a* and this prism surface **12***b* on the light entry **5**.

At the light exit there is, in turn, as a second device **9** for deflecting the light beam coming from the sample and running at an angle symmetric to the middle M, a deflection prism **15**—or optionally a deflection mirror, wherein this second device **9** is arranged mirror-symmetric to the middle M of the device **1** between the entry and exit, so that the optical axis L of a light beam emerging from the reflector **8** and running at an angle to this second device **9** runs horizontally again at or behind the light exit, as can be seen in both figures. The optical axis of the deflected light beam thus runs after the deflection on the shortest possible path to the receiving position **4** or the sample located there and the reflector **8** arranged above, so that a correspondingly small overall height of the device **1** is enabled.

In both embodiments, it is provided that the receiving position **4** is constructed as a surface and is accessible from above. The medium **2** to be examined is held by gravity at this receiving position. Here, the receiving position **4** is dimensioned so large that the light running through to the reflector **8** and reflected back from this reflector passes twice through the receiving position **4** and through the medium. In this way, the measurement path through the sample formed by the medium **2** is twice as large as the distance of the receiving surface **4** from the surface of the reflector **8** and the light covers this distance twice. In this way, the measurement path is twice as large as the mentioned distance.

In the embodiment according to FIG. **1**, the light runs from the first device **7** after its deflection practically unhindered through an open space R within the housing **6** to the sample **2** and after reflection from the reflector **8** in the same way back to the second device **9**.

In the embodiment according to FIG. **2**, however, the light bundle is guided by the optical waveguides **16** and **17** and is therefore compacted in its cross section. Directly after the deflection and before the receiving position **4**, however, there is the already mentioned convex lens **10** bundling the light or a corresponding optical window, wherein such a convex lens **10** is then also provided in the reflected light in front of the second device **9**.

The receiving position **4** is lowered in both embodiments relative to the upper end side of the housing **6** covered by the reflector **8** or a cover **18** holding this reflector, so that the boundaries of this lowered section simultaneously limit the receiving position **4** and therefore contribute to the fact that a very small amount of a sample is already held and can be examined.

The reflector **8** can be a mirror or a reflective prism and can contact the sample of the medium **2** with no spacing in the position of use. As mentioned, the measurement path through the sample is then twice as large as the distance of the receiving position **4** from the surface of the reflector **8** and the light covers this distance twice for forming the total measurement path.

The reflector 8 that can be placed on top or mounted detachably or the cover 18 holding this reflector according to FIGS. 1 and 2 is locked in rotation and centered relative to the device 1 and its housing 6 in the position of use. The distance of the reflector 8 from the receiving position 4 is here fixed by the spacer 19 between the reflector 8 and housing 6 or—in both embodiments—between the cover 18 holding the reflector 8 and the housing 6. Here, this spacer 19 can preferably rotate like a ring, in order to maintain a uniform distance.

The device 1 preferably has the outer dimensions of an optical cell, which can be fitted into a photometer, a spectrophotometer, fluorometer, or spectrofluorometer and which can be pumped by light, and the devices 7 and 9 arranged in the interior of the device 1 for deflecting light are here arranged at the position, at which for typical optical cells, entry and exit windows are provided for the light used for measurement. The first device 7 for deflecting light deflects the light radiating in from the photometer or the like to the receiving position 4, while the second device 9 is used for deflecting the light coming back from this measurement position to the detector. The outer dimensions of the cross section of the device 1 correspond to those of a standard optical cell and equal, for example, 12.5 mm×12.5 mm.

Therefore, as can be seen in the figures, the optical axis L of the emerging light beam aligns with that of the incoming light beam 3, but these two areas of the light beam could also enclose a right angle if the two devices 7 and 9 are rotated relative to each other accordingly.

The device 1 for the analysis or absorption measurement of a small amount, for example, of a drop or a droplet of a liquid medium 2 with the help of light 3 has an upper planar receiving position 4 for depositing or dropping the medium 2 and a light entry 5 located in the position of use underneath this receiving position or receiving surface 4 in the housing 6 and also, in the beam path behind this light entry 5, a first device 7 for deflecting the light upward to the receiving position 4, where a reflector 8 that can be mounted detachably is also located. Here, the device 7 for deflecting the light beam is constructed so that the direction of the optical axis of the deflected light beam is oriented upward and toward the middle M of the device 1 and the inclined position of the optical axis of the light beam is arranged relative to the device middle M so that it is directed toward the position of the reflector 8, through which the longitudinal middle M runs between the light entry 5 and the light exit of the device 1. The overall height of the device 1 can be correspondingly smaller than one, in which the light is first deflected by a right angle and only then is directed via another change in direction toward the receiving position or sample.

The invention claimed is:

1. Device (1) for the analysis or absorption measurement of a small amount of a liquid medium (2) with the help of light (3), which is guided through the medium (2) and then can be detected or analyzed with a photometer, spectrophotometer, fluorometer, or spectrofluorometer, the device (1) comprising an upper planar receiving position (4) for deposition or dropping of the medium (2) in a position of use, a light entry (5) located in the position of use underneath the receiving position (4) in a housing (6) and a first device (7) located in the beam path at the light entry (5) for deflecting the light upward toward the receiving position (4) and a reflector (8) that is mounted detachably above the receiving position (4) and that has, in a position of use, a defined spacing from the receiving position (4) that is filled or can be filled at least in a region of the light passage by the medium (2), wherein there is a second device (9) for deflecting the light coming from the reflector (8) toward a detector, the first device (7) arranged at the light entry (5) is constructed for deflecting the light beam, so that a resulting direction of an optical axis of the deflected light beam is oriented upward and at an angle to a middle (M) of the device (1) and the angled position of the optical axis is here arranged relative to the device middle (M) so that the optical axis of the light beam is directed without or with the help of at least one optical element toward a position of the reflector (8), through which the longitudinal middle (M) extends between the light entry (5) and the light exit of the device (1).

2. Device according to claim 1, wherein as the optical element for deflecting light beam toward the reflector (8) and then from the reflector (8) to the light exit or to a second device located at the light exit for deflecting the light beam, there is at least one of one lens, one prism or one optical waveguide (16; 17).

3. Device according to claim 1, wherein the light beam runs out from the deflection device unguided or undirected toward the receiving position (4).

4. Device according to claim 1, wherein at least one of before or after the entry of the deflected light beam into the free space (R) traversed by the light beam or an optical waveguide (9) there is an optical element acting as at least one of a window or for bundling the light beam.

5. Device according to claim 1, wherein the optical axis of the light beam (3) extends horizontally at least one of in front of or at the light entry (5) in the housing (6) and the first device (7) for deflecting the light beam deflects its optical axis (L) upward by less than 90°.

6. Device according to claim 1, wherein in a region of the light entry (5), as the first device (7) for deflection, there is a deflection prism (12) or a deflection mirror, having a reflective surface (13) that has an angle (14) less than 45° relative to the optical axis of the incident light beam.

7. Device according to claim 6, wherein on the prism (12), there is a surface (12*a*), through which the light beam exits after the deflection, that is oriented perpendicular to the deflected light beam or to an optical axis (L) thereof and forms an angle less than 90° with a prism surface (12*b*) located at the light entry (5).

8. Device according to claim 6, wherein on the light exit, the second deflection device (9) comprises a deflection prism (15) or deflection mirror, and the second deflection device (9) is arranged mirror-symmetric to the middle (M) of the device (1) between the entry and exit, so that the optical axis (L) of a light beam emerging from the reflector (8) and extending at an angle extends horizontally at or behind the light exit.

9. Device according to claim 1, wherein the receiving position (4) is accessible from above and the medium to be examined can be fixed or is held by gravity on the receiving position (4).

10. Device according to wherein the receiving position (4) is dimensioned so large that the light (3) running to the reflector (8) and reflected back from the reflector is guided at least once through the receiving position (4) and through the medium (2).

11. Device according to claim 1, wherein the receiving position (4) has a lowered section relative to an upper end side of the housing (6) covered by the reflector (8) or a cover (18) and boundaries of the lowered section limit the receiving position (4).

12. Device according to claim 1, wherein the reflector (8) is a mirror or a reflective prism and contacts the sample of the medium (2) without spacing in the position of use.

13. Device according to claim 1, wherein the measurement path through the sample is twice as large as a distance of the

receiving position (4) from a surface of the reflector (8) and the light covers this distance twice for forming a total measurement path.

14. Device according to claim 1, wherein the reflector (8) can be placed or mounted detachably or a cover (18) holding the reflector is locked in rotation and centered relative to the device (1) and the housing (6) thereof in the position of use.

15. Device according to claim 1, wherein a distance of the reflector (8) from the receiving position (4) is fixed by at least one spacer (19), which is arranged between the reflector (8) or cover (18) and housing (6), or by at least one stop.

16. Device according to claim 1, wherein the device (1) has outer dimensions corresponding to an optical cell, which can be fitted into a photometer, spectrophotometer, fluorometer, or spectrofluorometer and which can be pumped by light, and the devices (7, 9) arranged in an interior of the device (1) for

guiding or deflecting light are arranged at a position of the device (1), at which, for typical optical cells, entry and exit windows for the light (3) used for the measurement are provided, wherein the first deflection device (7) deflects the light radiating in from the photometer or the like to the receiving surface (4) and the second device (9) for light deflection deflects the light coming back from the measurement position to a detector.

17. Device according to claim 16, wherein the outer dimensions of a cross section of the device (1) correspond to those of a standard optical cell and equal, in particular, 12.5 mm×12.5 mm.

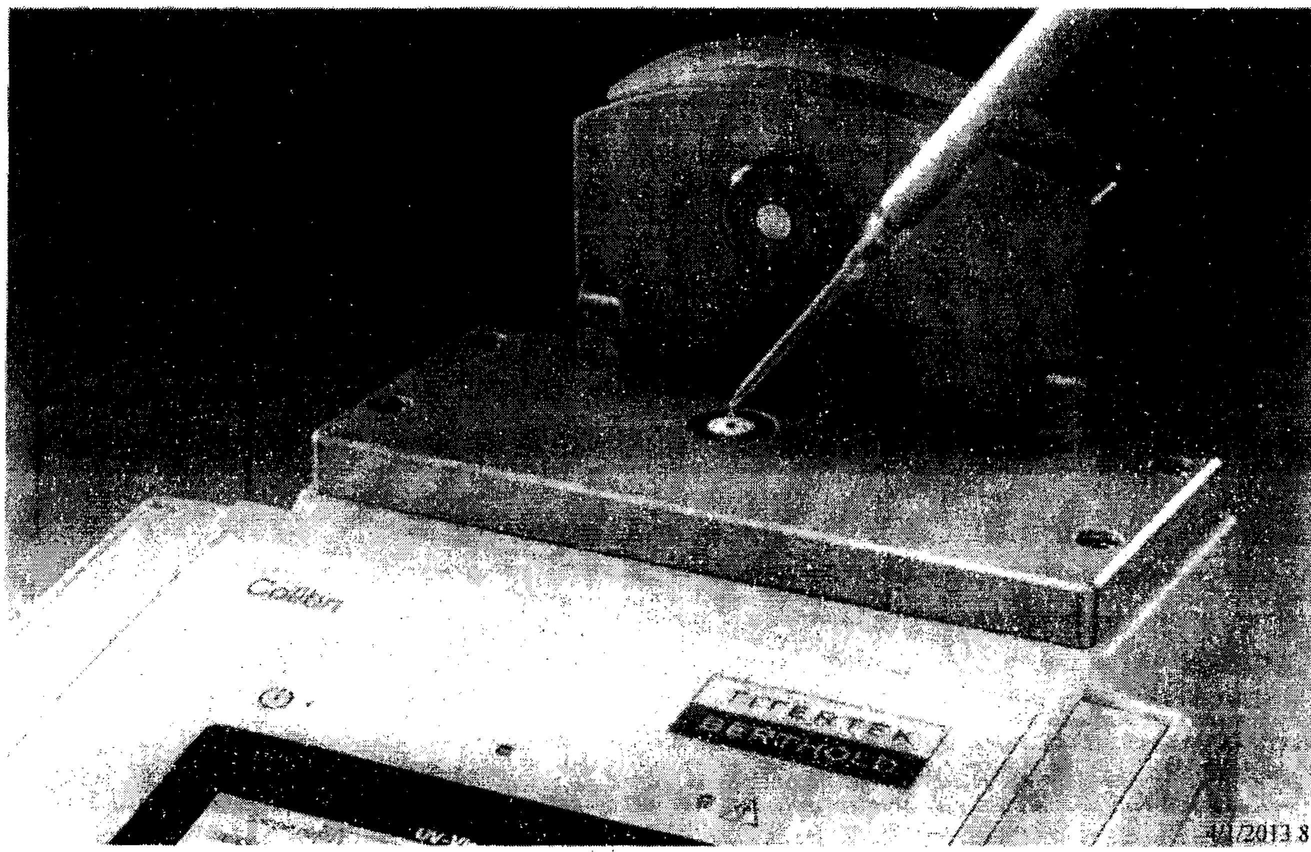
18. Device according to claim 16, wherein the optical axis (2) of the emerging light beam (3) aligns with that of the incoming light beam or encloses a right angle.

* * * * *

TITERTEK BERTHOLD

Colibri Microvolume Spectrometer

For DNA RNA, Protein and More



For DNA, RNA, Protein and More.

Imagine the speed and precision of a hummingbird, a rock solid optomechanical setup, and everything inside of a tiny housing – this is Colibri.

Colibri is only 16.5 cm wide

Smallest Sample Volumes

Even the smallest samples can be easily pipetted into the measurement position. The hydrophobic ring facilitates sample placement. After measurement, the sample can be wiped off or recovered.

High Dynamic Range

The optical pathlength can be set to 0.2 or 1 mm. A motor positions the sample chamber to the chosen pathlength with highest precision. For some protocols, the instrument can be set to automatically select the best pathlength.

Precise, Reproducible Measurement.

The compressed sample is surrounded by inert materials. This eliminates evaporation of the free liquid column, which means there will be no increase of concentration and false results. Unlike conventional instruments, the surfaces do not require frequent reconditioning.

Intuitive Touchscreen Operation

In addition to the intuitive color touchscreen interface, entries can be made on softkeys, or on the optional computer mouse or even a separate

Instant Setup

Turn on Colibri and you are ready to go. No extra PC, cuvette, or loose parts are required, and there is nothing to be connected.

Software

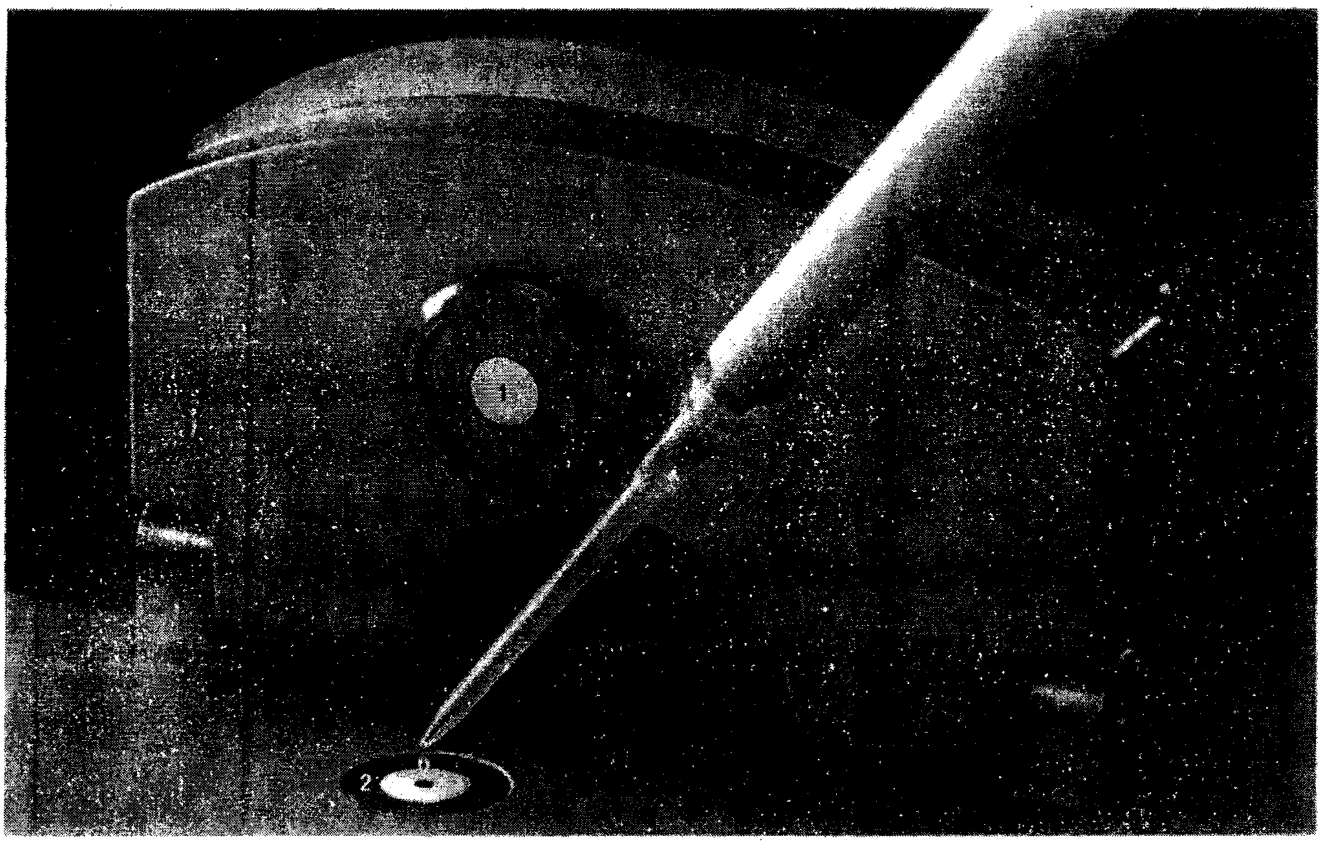
Colibri offers a comprehensive on-board software package

Measurement data is organized and saved according to the project and can be retrieved at any time. With a 2 GB internal memory, this capacity will last for the life of the instrument. Samples can be named individually or automatically for later identification and reporting.

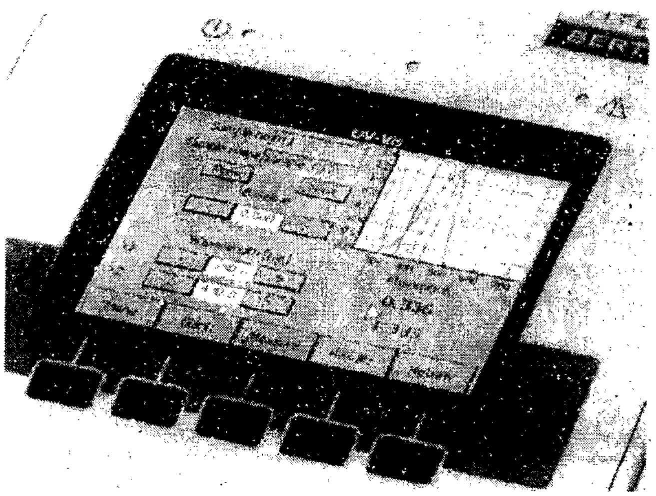
Reports are available on a printer or as CSV files. The printout is 112 mm wide allowing for a layout in a convenient format. Alternatively, reports can be saved on a USB memory stick for further processing on a lab computer.

For measurement and calculation of concentrations, up to 9 preset protocols are available. Whereas DNA or RNA measurements do not require much calculation, protein measurements represent a wide field. Five protocol types take care of all known requirements, such as measurement at 280 nm, Bradford and Lowry methods, different dye labels and many more. Standard curve calculations include point-to-point, polynomial, sigmoid and exponential

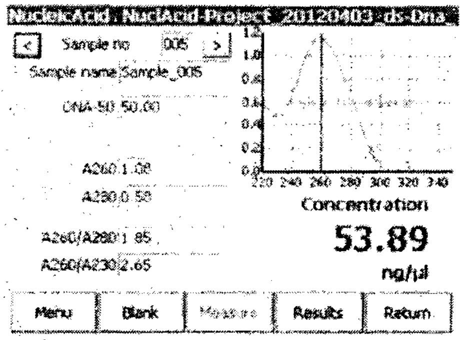
For DNA, RNA, Protein and More.



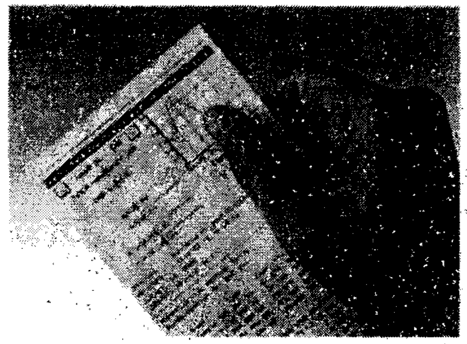
1 Optical grade mirror behind sapphire glass 2 Permanent hydrophobic coating for easy sample placement



Colibri Technical Data



Numerical and graphical measurement results on one screen



Comprehensive report, convenient printout format.

Performance Data	
Sample Volume	1–5 µl
Sensitivity dsDNA	2–3700 ng/µl

System Properties	
Standalone Operation	Built-in software
User Interaction	Touchscreen and softkeys
Protocols	Nucleid Acid, Protein, Cell Lysate, UV-VIS
Report	Wide 112 mm printout with data and graph
Display	3,7" color touchscreen
Interfaces	3 USB ports
Additional Data Input	Mouse and keypad options
Data Export	By USB memory stick, CSV format, data and graph

Optical Specifications	
Pathlength	0,2 mm and 1 mm, autoselect function
Wavelenth Range	200–850 nm
Lamp	Xenon Flashlamp
Detecter	2048 pixel array
Wavelength Accuracy	< 1 nm
Wavelength Resolution	3 nm
Photometric Range	0,02–75 OD (10 mm equivalent absorbance)
Photometric Accuracy	< 2% at 1.0 OD / 430 nm

General specifications	
Dimensions	26,5 x 16,5 x 13,4 cm
Weight	2,5 kg
Power	Power supply input 100–240 V AC, output 12 V min. 2,5 A DC (included)
Printer	External printer (optional)

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April 29, 2013

Russell F. Behjatnia, Esq.
14401 Gilmore Street, Suite 100
Van Nuys, CA 91401

Via Facsimile
and U.S. First Class Mail

Re: Your Ref.: Colibri Microvolume Spectrophotometer
Our Ref.: 24926-0002

Dear Mr. Behjatnia:

Further to my letter of April 12, 2013, we have now reviewed U.S. Patent No. 7,483,138 (the "138 patent") vis-à-vis our client's Colibri Microvolume Spectrometer ("Colibri").

You stated in your letter that "the brochure of [my client's product] suggests that said product is utilizing the invention of my clients." We believe that your reliance on the Colibri brochure has left you with an incorrect and incomplete understanding of the Colibri vis-à-vis your client's patent. For example, we do not believe you could ascertain from the Colibri brochure the interior components of the Colibri that are necessary to compare it to claim 1 of the '138 patent. You obviously already appreciate that your understanding of the Colibri is incomplete since you asked in your letter for us "to explain the facts."

Accordingly, to respond to your letter, we carefully examined the Colibri itself and reviewed detailed drawings that illustrate the specific interior structure of the Colibri. Based upon our analysis of the actual structure and design of the Colibri relative to claim 1 of the '138 patent, we can assure you that the Colibri does not infringe the '138 patent.

As you know, patent infringement requires a showing that each element or limitation of the asserted claim is found in the accused product. See, e.g., TIP Systems, LLC v. Phillips & Brooks, 529 F.3d 1364 (Fed. Cir. 2008). Several elements of claim 1 are missing from the Colibri, and therefore, there can be no infringement.

First, claim 1 of the '138 patent requires "a light entry (5) located in the position of use underneath the receiving position (4) in a housing (6)." The Colibri is entirely missing this claim element. There is no light entry in the housing of the Colibri; it instead produces light internally.

Claim 1 also requires "a first device (7) located in the beam path of the light entry (5) for deflecting the light upward toward the receiving position (4) and the reflector (8) that is mounted

EXHIBIT D

detachably toward the receiving position (4)." The '138 patent teaches that the "first device" is embodied as a prism 12 (see Fig. 1). The Colibri has no such "first device." Indeed, the light that is internally produced by the Colibri is not deflected; it is instead projected in a straight line from the source to the sample.

Further, claim 1 requires "a reflector (8) that is mounted detachably above the receiving position (4)." Here again, the Colibri has no detachable reflector. The Colibri has a reflector, but it is secured to the main part of the device by a hinge; it cannot be detached.

We believe that there are other reasons that the Colibri does not infringe any claim of the '138 patent, but we believe that the three elements of claim 1 just noted that are entirely lacking in the Colibri should provide you sufficient information to reconsider your position.

We trust that you will either rely on our assurances or confirm non-infringement for yourself by comparing claim 1 of the '138 patent with the actual structure and components of the Colibri. In the unlikely event that you should disagree with our conclusion or otherwise maintain the allegation that the Colibri infringes the '138 patent, please provide us a claim chart listing each element of claim 1 and adjacent to it a description of the corresponding structure of the Colibri. Please include in the chart or separately an explanation of how you believe the particular structure you have identified meets the functional requirements of the corresponding claim element. Please also provide us with part descriptions, drawings, photographs, etc., which illustrate the exact structure of the Colibri that you believe meets the claim elements so that we may fully understand your position.

If you should have any questions, please contact me. If I do not hear from you within fifteen (15) days of the date of this letter, we will consider this matter closed.

Very truly yours,

Michael C. Bartol

MCB/es/pcs

cc: Dr. Niels Mommer, Twelmeier Mommer & Partner
C. Pinkus, Esq.

2339997

Law Offices of
Russell F. Behjatnia

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May 30, 2013

Bose, Mc Kinney & Evans LLP
Michael C. Bartol
111 Monument Circle, Suite 2700
Indianapolis, IN 46204
Email: mbartol@boselaw.com

Re: Colibri Microvolume Spectrophotometer
Your file No.: 24926-0002

Dear Mr. Bartol:

We have reviewed your response together with the available technical documentation thoroughly and are convinced that the Colibri Microvolume Spectrophotometer (Colibri) of your client is infringing US Patent No. 7,483,138 and the corresponding international patent family of my client.

In particular we would like to respond to your citations as follows:

1. You are arguing that the head of Colibri is not showing a housing with a light entry underneath the receiving position and that the instrument is producing the light internally instead.
   According to the published facts the Colibri has an integrated housing that guides the light up to the sample receiving position. With the design the lamp could actually be detached from the setup leaving a housing with a light entry and a device to guide the light in a set angle to the receiving position.

2. Your input regarding the lacking first deflection is incorrect. According to the available technical facts one or more optical components are integrated to bring the emitted light from the lamp to the receiving position at a defined angle.

3. A hinge added to a detachable reflector is not bypassing the detachable nature of the reflector. To allow the Colibri to work, a detachable reflector actually is needed to allow users to pipette a sample onto the receiving position and to consequently be able to analyze the sample. The hinge has to be considered as an add-on to the technology of our clients which the Colibri is clearly utilizing as the technology backbone of the system.

EXHIBIT E

Based on the factual and legal position we are asking your client to stop the use of the technology described in US Patent No. 7,483,138 and the corresponding international patent family with immediate effect. Should your client intend to continue the use of the technology described in US Patent No. 7,483,138 and the corresponding international patent family, my client is offering the possibility to enter into a license agreement allowing the unlimited use of the technology in the current setup of the Colibri system. A draft copy of the agreement can be found enclosed to this letter.

We are expecting your client's decision latest by June 11, 2013.

Sincerely yours,

Russell F. Behjatnia, Esq.

BOSE McKINNEY & EVANS LLP

ATTORNEYS AT LAW

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June 11, 2013

Russell F. Behjatnia, Esq.
14401 Gilmore Street, Suite 100
Van Nuys, CA 91401

Via Electronic Mail and U.S. Mail

Re: Your Ref.: Colibri Microvolume Spectrophotometer
Our Ref.: 24926-0002

Dear Mr. Behjatnia:

We have received your letter of May 30, 2013. We maintain that the Colibri does not infringe the '138 patent for at least the same reasons we provided in our earlier letter.

In point 2 of your letter, you allege that "one or more optical components [of the Colibri] are integrated to bring the emitted light from the lamp to the receiving position at a defined angle." We disagree with your rewording of what is claimed. Specifically, claim 1 requires a "*first device (7) located in the beam path at the light entry (5) for deflecting the light upward toward the receiving position.*" We interpret the term "deflecting" in the '138 patent to be consistent with its ordinary meaning, namely, that the first device causes the light beam to change direction. Similarly, the term "deflecting" is used exclusively in the '138 patent to connote a change of direction in the light beam. We count 99 instances of the words "deflection," "deflecting," "deflected," "deflects" and "deflect" in the '138 patent.

The '138 patent explains why deflecting the incoming and exiting light beams is necessary:

> In this way, the light entry and light exit correspond to those of a conventional optical cell, so that feeding of the light and also its detection after passing through the sample can be performed very easily primarily in corresponding, already existing measurement devices. . . .

'138 patent, col. 4, lines 12-16. Thus, the '138 patent does not teach a stand-alone device, but instead teaches a device that can be used "in most commercially available measurement devices . . . and in older measurement devices without modification." Id., col. 4, lines 40-44.

In contrast to claim 1 of the '138 patent, and as we noted in our letter of April 29, 2013, in the Colibri, the light that is internally produced is not deflected, i.e., it does not change direction. The light is instead projected in a straight line from the source to the sample. Unlike the device taught in the '138 patent, the Colibri is a stand-alone device that has not been adapted

EXHIBIT F

to be coupled to "already existing measurement" devices. The "deflecting" required by claim 1 of the '138 patent is therefore completely absent from and unnecessary to the Colibri.

This brings us to your allegation in point number 1 of your letter that the lamp could be detached in the Colibri device. As just noted, however, the Colibri is not an optical cell and does not contain an optical cell that couples to an existing device such as a spectrophotometer. Indeed, if the light source of the Colibri were removed as you suggest, the Colibri would no longer be functional. Nor would it be a device "for the analysis or absorption measurement of a small amount of liquid medium with the help of light" as recited in claim 1.

You also argue in your point number 1 that detaching the lamp from the Colibri would produce "a housing with a light entry and a device to guide the light in a set angle to the receiving position." Your contention misstates what is claimed. Specifically, claim 1 of the '138 patent does not recite a "set angle to the receiving position." It instead recites "*deflecting the light upward toward the receiving position.*" Removing the lamp from the Colibri would not result in the "deflecting" required by claim 1.

A claim chart, which we had requested in our previous letter, repeats the language of the claims verbatim and forces the exact language of the claims to be compared to the device in question. It thus avoids rewording of claim language as has been done in your letter.

Finally, as we noted in our previous letter, there are additional reasons that the Colibri does not infringe the '138 patent. For example, claim 1 further specifies that "*the longitudinal middle (M) extends between the light entry and the light exit of the device.*" The Colibri could not possibly meet the above recitation because the Colibri has no light exit. It instead has a detector inside of the housing.

A showing of patent infringement requires that the accused device includes each and every element claimed. You have not shown and we cannot envision how you could possibly show that the Colibri infringes any claim of the '138 patent.

Very truly yours,

Michael C. Bartol

MCB/es

cc: Dr. Niels Mommer, Twelmeier Mommer & Partner
C. Pinkus, Esq.

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