PATENT ASSIGNMENT

Electronic Version v1.1 Stylesheet Version v1.1

| SUBMISSION TYPE: | NEW ASSIGNMENT |
|-----------------------|----------------|
| NATURE OF CONVEYANCE: | ASSIGNMENT |

CONVEYING PARTY DATA

| Name | Execution Date |
|------------------------|----------------|
| Hans-Juergen Rostalski | 10/12/2011 |
| Tilman Schwertner | 10/04/2011 |
| Alexander Epple | 10/07/2011 |

RECEIVING PARTY DATA

| Name: | Carl Zeiss SMT GmbH |
|-----------------|-----------------------|
| Street Address: | Rudolf-Eber-Strasse 2 |
| City: | Oberkochen |
| State/Country: | GERMANY |
| Postal Code: | 73447 |

PROPERTY NUMBERS Total: 1

| Property Type | Number | |
|---------------------|----------|--|
| Application Number: | 13235651 | |

CORRESPONDENCE DATA

 Fax Number:
 (877)769-7945

 Phone:
 6175425070

 Email:
 apsi@fr.com

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent

via US Mail.

Correspondent Name: Sean Daley

Address Line 1: FISH & RICHARDSON P.C.

Address Line 2: P.O.BOX 1022

Address Line 4: MINNEAPOLIS, MINNESOTA 55440-1022

| ATTORNEY DOCKET NUMBER: | 20228-0059001 |
|-------------------------|----------------|
| NAME OF SUBMITTER: | Alissa Tizzano |

Total Attachments: 6

PATENT REEL: 027149 FRAME: 0940 132356

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Assignment

Whereas, I/We, ROSTALSKI, Hans-Juergen of Dietrich-Bonhoeffer-Strasse 9, 73447 Oberkochen, Germany hereinafter called assignor, have invented certain improvements in

Optical arrangement in a projection objective of a microlithographic projection exposure apparatus

and executed an application for Letters Patent of the United States therefor; and

Whereas, Carl Zeiss SMT GmbH, a corporation of Germany, having a place of business at Rudolf-Eber-Strasse 2, 73447 Oberkochen, Germany, hereinafter called assignee, desires to acquire the entire right, title, and interest in the application and the invention disclosed therein, and to any United States patents to be obtained therefor;

Therefore, for valuable consideration, receipt whereof is hereby acknowledged,

I/We, the above named assignor, hereby state as follows:

To the extent that my entire right, title and interest in the application and the invention disclosed therein have not transferred to the assignee by virtue of applicable law and/or contract, I/we hereby sell, assign and transfer to the above named assignee, its successors and assigns, the entire/remaining, present/expectant right, title and interest in the application and the invention disclosed therein for the United States of America, including all divisionals and continuations thereof, and all Letters Patent of the United States that may be granted thereon, and all reissues thereof, including the right to claim priority under 35 U.S.C. §119, and for all countries foreign thereto, including rights of priority under applicable conventions and treaties; and I/we request the Director of the U.S. Patent and Trademark Office to issue any Letters Patent granted upon the invention set forth in the application to the assignee, its successors and assigns; and I/we hereby agree that the assignee may apply for foreign Letters Patent on the invention; and I/we will execute without further consideration all papers deemed necessary by the assignee in connection with the United States and foreign applications when called upon to do so by the assignee.

I/We hereby authorize and request the attorneys of Fish & Richardson Attn.: Sean Daley One Marina Park Drive Boston, Massachusetts 02210 USA to insert here in

| parentheses (App | lication number 13/235651, filed 19 Sept | tember 2011 and Confirmation |
|------------------|---|------------------------------|
| number) ti | he application number and filing date of said | l application when known. |
| | Hows- Fire for Colors. Signature | October 12th 2011 Date |
| | Signature / | Date |
| | ROSTALSKI, Hans-Jürgen | |
| | Typed or printed name | |
| Witnessed by: | Edith - for | October 12 2011 |
| | Signature Edith Sorg | Date Date |
| | Typed or printed name | |
| Witnessed by: | | |
| | Signature | Date |
| | Typed or printed name | |

(Legalization not required for recording but is prima facie evidence of execution under 35 U.S.C. §261)

Assignment

Whereas, I/We, SCHWERTNER, Tilman of Egerlandstrasse 88, 73431 Aalen, Germany hereinafter called assignor, have invented certain improvements in

Optical arrangement in a projection objective of a microlithographic projection exposure apparatus

and executed an application for Letters Patent of the United States therefor; and

Whereas, Carl Zeiss SMT GmbH, a corporation of Germany, having a place of business at Rudolf-Eber-Strasse 2, 73447 Oberkochen, Germany, hereinafter called assignee, desires to acquire the entire right, title, and interest in the application and the invention disclosed therein, and to any United States patents to be obtained therefor;

Therefore, for valuable consideration, receipt whereof is hereby acknowledged,

I/We, the above named assignor, hereby state as follows:

To the extent that my entire right, title and interest in the application and the invention disclosed therein have not transferred to the assignee by virtue of applicable law and/or contract, I/we hereby sell, assign and transfer to the above named assignee, its successors and assigns, the entire/remaining, present/expectant right, title and interest in the application and the invention disclosed therein for the United States of America, including all divisionals and continuations thereof, and all Letters Patent of the United States that may be granted thereon, and all reissues thereof, including the right to claim priority under 35 U.S.C. §119, and for all countries foreign thereto, including rights of priority under applicable conventions and treaties; and I/we request the Director of the U.S. Patent and Trademark Office to issue any Letters Patent granted upon the invention set forth in the application to the assignee, its successors and assigns; and I/we hereby agree that the assignee may apply for foreign Letters Patent on the invention; and I/we will execute without further consideration all papers deemed necessary by the assignee in connection with the United States and foreign applications when called upon to do so by the assignee.

I/We hereby authorize and request the attorneys of Fish & Richardson Attn.: Sean Daley One Marina Park Drive Boston, Massachusetts 02210 USA to insert here in

| parentheses (Applica | tion number 13/235651, filed 19 Septer | mber 2011 and Confirmation |
|----------------------|--|----------------------------|
| number) the a | application number and filing date of said a | application when known. |
| | Jum Streether | 0/6bes 414 2011 |
| | Signature | Date |
| | SCHWERTNER, Tilman | |
| | Typed or printed name | |
| | | |
| Witnessed by: | Marichian Out | Add . 4 200 |
| | Morstina Gosting Signature | Date Y CO11 |
| | , | |
| | Typed or printed name | |
| Witnessed by: | | |
| | | |
| | Signature | Date |
| | Yumad as minted a mana | *********** |
| | Typed or printed name | |

(Legalization not required for recording but is prima facie evidence of execution under 35 U.S.C. §261)

Assignment

Whereas, I/We, EPPLE, Alexander of Langertstrasse 38, 73431 Aalen, Germany hereinafter called assignor, have invented certain improvements in

Optical arrangement in a projection objective of a microlithographic projection exposure apparatus

and executed an application for Letters Patent of the United States therefor; and

Whereas, Carl Zeiss SMT GmbH, a corporation of Germany, having a place of business at Rudolf-Eber-Strasse 2, 73447 Oberkochen, Germany, hereinafter called assignee, desires to acquire the entire right, title, and interest in the application and the invention disclosed therein, and to any United States patents to be obtained therefor;

Therefore, for valuable consideration, receipt whereof is hereby acknowledged,

I/We, the above named assignor, hereby state as follows:

To the extent that my entire right, title and interest in the application and the invention disclosed therein have not transferred to the assignee by virtue of applicable law and/or contract, I/we hereby sell, assign and transfer to the above named assignee, its successors and assigns, the entire/remaining, present/expectant right, title and interest in the application and the invention disclosed therein for the United States of America, including all divisionals and continuations thereof, and all Letters Patent of the United States that may be granted thereon, and all reissues thereof, including the right to claim priority under 35 U.S.C. §119, and for all countries foreign thereto, including rights of priority under applicable conventions and treaties; and I/we request the Director of the U.S. Patent and Trademark Office to issue any Letters Patent granted upon the invention set forth in the application to the assignee, its successors and assigns; and I/we hereby agree that the assignee may apply for foreign Letters Patent on the invention; and I/we will execute without further consideration all papers deemed necessary by the assignee in connection with the United States and foreign applications when called upon to do so by the assignee.

I/We hereby authorize and request the attorneys of Fish & Richardson Attn.: Sean Daley One Marina Park Drive Boston, Massachusetts 02210 USA to insert here in

| parentheses (Application | ation number 13/235651, filed 19 Septer | nber 2011 and Confirmation |
|--------------------------|--|---|
| number) the | application number and filing date of said a | pplication when known. |
| | Alexand Ew | OCT 7, 2011 |
| | Signature | Date * |
| | EPPLE, Alexander | |
| | Typed or printed name | |
| Witnessed by: | | |
| | Mrishina Gooding Signature | October 7, 2011 |
| | Signature | Date |
| | | |
| | Typed or printed name | |
| Witnessed by: | | |
| | Signature | Date |
| | | |
| | Typed or printed name | *************************************** |

(Legalization not required for recording but is prima facie evidence of execution under 35 U.S.C. §261)

PATENT REEL: 027149 FRAME: 0947

RECORDED: 10/31/2011