

**DEPARTMENT OF THE NAVY
OFFICE OF NAVAL RESEARCH
Arlington, Va, 22217**

DIRECTIVE: ONR 5870.1

NAVY CASE NO.

PATENT RIGHTS QUESTIONNAIRE

PRIVACY ACT STATEMENT - Under the authority of Executive order 10096, information regarding the making of your invention is requested in order to make a patent rights determination. The information provided by you will become a permanent part of the Navy patent case file on your invention. The information provided will not be divulged without your written authorization to anyone other than agencies of the U.S. Government with a proper interest in Government rights in inventions. You are required to provide this information and failure to do so could conceivably result in adverse performance evaluation or disciplinary action.

INVENTOR (*Last name, first, middle*)

Cortesi, Roger, Shapley and Slocum, Alexander

COGNIZANT PATENT COUNSEL

DESCRIPTIVE TITLE OF INVENTION

Double "L" Structure for a Machine Tool Base

CONCISE DESCRIPTION OF INVENTION

Using the Double "L" Structure as the base for a lathe allows 1) The elimination of Abbe (motion errors) due to roll of the workpiece carriage, and pitch of the tool carriage. 2) Closes the structural loop of the machine, INCREASING the dynamic stiffness and resonant frequencies of the machine. 3) Allows similar carriages to be used for the workpiece and tool carriages, which allows lots of common parts to be used in both carriages to reduce manufacturing costs.

INSTRUCTIONS

Under Executive order 10096 of 23 January 1950, as amended, and SECNAV Instruction 5870.3, it is necessary to determine the relative rights of the inventor and the Government to the invention described above. This determination depends on the circumstances under which the invention was made. The making of an invention generally requires its conception or discovery and also work on it in the form of writings, sketches or drawings or a model of full size device (or a combination of these) from which it can be established that the invention is considered "made" depends upon the circumstances surrounding each invention. for the purpose of this questionnaire, this date may be considered the earliest or first time

sketches or drawings, or in a model or full size device in such a manner that it was clear the invention was sound in principle and could be reduced to practice therefrom by one skilled in the field of the invention.

The inventor should **CAREFULLY READ THE ENTIRE QUESTIONNAIRE**. He should then answer the questions as completely as possible, using the above definition of the date invention was "made" and the above description as the definition of the invention. completion of questionnaire includes signatures at the end of the form by inventor and his supervisor. Original and one completed copies are to be returned to the cognizant Patent

I. INVENTOR'S EMPLOYMENT AT TIME INVENTION WAS MADE

1. JOB TITLE Cortesi: Naval Officer Slocum: Professor of Mechanical Engineering at MIT	2. GRADE Cortesi: Ensign Slocum: N/A	3. ACTIVITY (<i>Name and Location</i>) <i>Naval Nuclear Power Training Command, Charleston SC</i>
4. LABORATORY OR DEPARTMENT	5. DIVISION OR BRANCH	6. SECTION OR UNIT

7. OFFICIAL WORK ASSIGNMENT

	YES	NO		YES	NO
a. TO INVENT OR IMPROVE OR PERFECT ANY PROCESS, MACHINE, MANUFACTURE, OR COMPOSITION OF MATTER		NO	b. TO CONDUCT OR PERFORM RESEARCH OR DEVELOPMENT WORK		NO
c. TO SUPERVISE, DIRECT, COORDINATE OR REVIEW GOVERNMENT FINANCED OR CONDUCTED RESEARCH OR DEVELOPMENT WORK.		NO	d. TO ACT IN LIAISON CAPACITY AMONG GOVERNMENTAL OR NON-GOVERNMENTAL AGENCIES OR PERSONS DOING SUCH RESEARCH OR DEVELOPMENT WORK		NO

II. ASSIGNMENT OF INVENTION

Executive Order 10096 provides that Government employees who are employed or assigned to perform any of the duties listed in Section I, items 7a through 7d above, and who make inventions as a direct result of, or make inventions having a direct relation to their assigned duties, may be required to assign the entire right, title and interest in the invention to the Government. Therefore, if any of the question 7a through 7d above were answered in the affirmative, and the inventor believes that the invention was made as a direct result of, or related directly to his assigned duties, and in the inventor may sign the statement below and omit Sections III and IV of this questionnaire. In case of doubt, assistance should be requested from a Navy Patent representative.

AS THE INVENTION DESCRIBED HEREIN WAS MADE AS A DIRECT RESULT OF THE PERFORMANCE OF MY ASSIGNED DUTIES, I HEREBY AGREE TO ASSIGN THE ENTIRE RIGHT, TITLE AND INTEREST IN THE INVENTION TO THE GOVERNMENT AND I UNDERSTAND THAT I WILL RETAIN NO RIGHTS IN THE INVENTION.

INVENTOR'S SIGNATURE

DATE

III RELATIONSHIP BETWEEN INVENTION AND INVENTOR'S ASSIGNED DUTIES

1. DID INVENTOR HAVE THE IDEA FOR THE INVENTION BEFORE WORK WAS DONE ON IT BY ANYONE ON GOVERNMENT TIME?	YES		3. WAS THIS TASK ASSIGNED TO THE INVENTOR BEFORE HE "MADE" THE INVENTION?		NO
2. WAS THE INVENTION A SET GOAL OF A SPECIFIC OR DETAILED TASK ASSIGNED TO THE INVENTOR?		NO	4. COULD THIS TASK HAVE BEEN SUCCESSFULLY COMPLETED WITHOUT "MAKING" AN INVENTION? ON GOVERNMENT TIME?		NO

INVENTOR'S OFFICIAL DUTIES AT TIME THE INVENTION WAS "MADE" (specify in detail those duties or assigned tasks or projects which were related or closely connected to the invention. If in doubt, attach a copy of applicable position description or as much of it as sets forth pertinent duties. If no related duties, tasks or projects were assigned to the inventor, state any related or closely connected tasks or projects assigned to the inventor's Branch or Section, if known. If the invention did not closely relate to either the inventor's duties or those of his Branch or Section, give a general statement of duties assigned).

The idea for this lathe was conceived by Prof. Slocum as a spin off project from ENS Cortesi Master's thesis. The Double "L" concept was developed jointly by Prof. Slocum and ENS Cortesi. Most of the development of the Double "L" base concept was figured out modeled etc. while ENS Cortesi was going through the training pipeline to enter the submarine force. Specifically ENS Cortesi's duties at the time (and continue to be) were to learn to operate and supervise the Navy's nuclear reactors.

I. I. 6. DESCRIBE THE RELATIONSHIP BETWEEN THE INVENTION AND THE INVENTOR'S OFFICIAL DUTIES, ASSIGNED TASKS OR PROJECTS AS STATED IN ITEM #5 ABOVE.

There is no relationship between the invention and ENS Cortesi's official duties.

IV. MAKING OF THE INVENTION

I. CIRCUMSTANCES SURROUNDING THE "MAKING" OF THE INVENTION (State when, where, and how)

ENS Cortesi and Professor Slocum was brainstorming on different configuration for this lathe, and after sketching out about a dozen or they came up with the idea for the Double "L" configuration, which had the most desirable traits of all the concepts.

Some basic mathematical models confirmed that it reduced the error motions (Abbe errors) the most of all the considered concepts. About seven iterations of Finite Element Analysis confirmed our intuition that when the carriages were added to the Double "L" design the resonant frequencies would increase. Using some computer aided design packages confirmed that a variety of motive and bearing components could be easily incorporated depending on the customer's needs and preferences.

2a. WAS THE INVENTION DESCRIBED IN DRAWINGS, SKETCHES, AND WRITINGS FROM WHICH INVENTION COULD BE CONSIDERED "MADE"; IF "NO" OMIT 2b.	YES	NO	3a. WAS A MODEL OF FULL SIZE DEVICE MADE OF THE INVENTION OF ITS PROCESS TRIED OUT? IF "NO", OMIT 3b AND 3c	YES	NO
	YES				NO
b. HOURS SPENT BY INVENTOR IN MAKING THESE DRAWINGS, SKETCHES AND WRITINGS OWN TIME <u>100+</u> GOV'T TIME <u>NONE</u>			b. WAS THE MODEL OR DEVICE MADE AND TESTED OR THE PROCESS TRIED OUT BECAUSE IT WAS (1) DOUBTFUL WHETHER IT WOULD WORK AT ALL (2) DESIRED TO DETERMINE ITS USEFULNESS TO THE NAVY		
4. WAS THE INVENTION DEVELOPED FROM A CRUDE FORM TO A PRACTICAL FORM USING GOVERNMENT TIME, FACILITIES, EQUIPMENT, MATERIALS, FUNDS, SPECIAL INFORMATION OR TIME OR SERVICES OF OTHER GOVERNMENT EMPLOYEES?		NO*	c. HOURS SPENT BY INVENTOR IN MAKING THE MODEL OF DEVICE OR TRYING OUT THE PROCESS OWN TIME _____ GOV'T TIME _____		

5. IN THE MAKING OF THE DRAWINGS, SKETCHES, AND WRITINGS AND ANY MODEL OR FULL SIZE DEVICE OF THE INVENTION AND IN THE OPERATING, TESTING, TRYING OUT AND DEVELOPMENT OF THE INVENTION, WHAT WERE THE CONTRIBUTIONS OF THE GOVERNMENT AND THE INVENTOR OF FACILITIES, EQUIPMENT, MATERIALS, FUNDS, SPECIAL INFORMATION OR TIME OR SERVICES OF OTHER GOVERNMENT EMPLOYEES?

I. I. a. GOVERNMENT CONTRIBUTION

ENS Cortesi's salary

***ENS Cortesi's laptop was provided for me by ONR to work on his PhD and any other projects that he thought might benefit the Navy**

I. I. b. INVENTOR'S CONTRIBUTION

ENS Cortesi's free time

MIT paid the tuition for my Masters from which this project is a "spin-off"

MIT provided all the CAD, FEA and software packages used to develop the concepts, models, and prediction

MIT is paying for my high speed internet connection to remain in contact with Prof. Slocum and to facilitate my research on the project.

ENS Cortesi paid his own travel expenses associated with the project.

INVENTOR (Signature)	CONCURRENCE SIGNATURE OF INVENTOR OR SUPERVISOR DATE
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