

The opinion in support of the decision being entered today was not written for publication in a law journal and is not binding precedent of the Board.

Paper No. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SIMON RAAB

Appeal No. 1999-0594
Application No. 08/434,010

ON BRIEF

Before URYNOWICZ, FLEMING and RUGGIERO, Administrative Patent Judges.

URYNOWICZ, Administrative Patent Judge.

Decision on Appeal

This appeal is from the final rejection of claims 1-9.

The invention pertains to a method for generating an error map. Claim 1, the sole independent claim, is illustrative and reads as follows:

1. A method for generating an error map for multi-axis devices in order to improve the repeatability and/or precision of multi-axis devices comprising the steps of:

Appeal No. 1999-0594
Application No. 08/434,010

(1) attaching the measurement arm of a passive three dimensional coordinate measuring machine (CMM) having multiple degrees of freedom to a multi-axis device and operating the CMM through a selected 3-dimensional path or operation which emulates the desired preselected programmed path or operation of the multi-axis device;

(2) developing 3-dimensional data of at least one of (a) position and (b) orientation from step (1) and storing said data, said data defining the actual path or operation of the multi-axis device;

(3) comparing the actual path or operation to the desired preselected programmed path or operation;

(4) generating an error map comparing the actual path or operation to the desired preselected programmed path or operation; and

(5) using said error map to improve the repeatability and/or precision of the multi-axis device.

The references relied upon by the examiner are:

Vold	4,937,759	Jun. 26, 1990
Taylor et al. (Taylor)	5,007,006	Apr. 09, 1991
Chapman et al. (Chapman)	5,259,120	Nov. 09, 1993

Claims 1-9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Taylor in view of Chapman and Vold.

The respective positions of the examiner and the appellant with regard to the propriety of these rejections are set forth in the final rejection and the examiner's answer (Paper Nos. 10 and 14, respectively) and the appellant's brief (Paper No. 13).

Appellant's Invention

The invention is described at pages 2 and 3 of the brief.

The Prior Art

Taylor discloses a method and apparatus for dynamically calibrating a multi-axis machine. The invention of Taylor is described at page 4, lines 7-12, of the brief and at the last paragraph of page 2 of the final rejection.

Chapman discloses a coordinate measurement device for use with multi-axis devices. A ball-bar 26 is coupled to a machine head 12 to determine error in movement of the machine head. The head is movable in a three-dimensional manner, i.e., within three coordinate directions relative to the base 10.

In Figure 1, Vold illustrates apparatus having a plurality of arm joints 2, 4, 6, 8, 10, 12 and 14 which allow the location and orientation of the tool 16 to be adjustable anywhere within the working area of the arm device.

Grouping of Claims

At page 3 of the brief, appellant has stated that claims 1-6 and 9 stand or fall together, and that each of claims 7 and 8 stands or falls alone.

Opinion

After consideration of the positions and arguments presented by both the examiner and the appellant, we have concluded that

Appeal No. 1999-0594
Application No. 08/434,010

the rejection of claims 1-7 and 9 should be sustained and that the rejection of claim 8 should be reversed.

Appellant argues that the ball-bar 26 of Chapman is not equivalent to the claimed coordinate measuring machine (CMM). It is urged that the logical combination of Taylor and Chapman is to use the ball-bar taught by Chapman for calibrating the machine or multi-axis device of Taylor. The contention is made that although Chapman teaches using the ball-bar with a variety of devices, it does not suggest combining a CMM having multiple degrees of freedom to a multi-axis device.

It is submitted that in the two embodiments of Chapman, the ball-bars measure dimensions in a single, linear axis and, accordingly, have only one degree of freedom. Whereas claim 1 recites that the CMM has multiple degrees of freedom, the invention of claim 1 does not result from a combination of Taylor and Chapman.

We are not persuaded by these arguments. The examiner does not contend that Chapman's ball-bar and a CMM are equivalents. In this respect, it appears that appellant has misconstrued the examiner's position. Furthermore, the fact that a logical combination of Taylor and Chapman may be to use the ball-bar taught by Chapman for calibrating the multi-axis machine of

Appeal No. 1999-0594
Application No. 08/434,010

Taylor, alone, is irrelevant. The examiner's position is to the effect that a logical combination of the two references is to use the ball-bar (the "invention" of column 2, line 59) and CMM combination also taught by Chapman at column 2, lines 57-62, for calibrating the multi-axis machine of Taylor. The contention that Chapman does not suggest combining a CMM having multiple degrees of freedom and a multi-axis device is not controlling. In the final rejection at page 3, lines 19-22, the examiner contends that Taylor specifically suggests the combination of the teachings of the three references by stating that his invention is intended to be used in conjunction with machines such as CMM's and machine tools. This position of the examiner is reasonable and is not addressed by appellant.

The fact that the ball-bar of Chapman measures dimensions in a single, linear axis is not evidence that the rejection should not be sustained. What is relevant in Chapman is that the spindle or head 12 is movable in three coordinate directions relative to the table 10; the examiner relies on Taylor for the teaching of apparatus which develops 3-dimensional data and Vold for a teaching that CMM's have multiple degrees of freedom.

With respect to dependent claim 7, it is argued that Chapman's ball-bar does not include 6 degrees of freedom.

Appeal No. 1999-0594
Application No. 08/434,010

This argument is not persuasive because it does not address the examiner's position at page 4, lines 8 and 9, of the final rejection that, at column 6, lines 31-35, Taylor teaches the ability to analyze six degrees of freedom or at page 5, lines 3 and 4, of the answer that Vold teaches the rotation of various arm joints in multiple degrees of freedom. As noted above, Vold teaches seven arm joints. These joints enable at least 6 degrees of freedom.

We will not sustain the rejection of dependent claim 8 because there is no showing that the combined prior art teaches or suggests 6 joints wherein each of said joints comprises a rotational transfer housing for housing a position transducer.

Summary

The rejection of claims 1-7 and 9 is sustained.

The rejection of claim 8 is reversed.

Appeal No. 1999-0594
Application No. 08/434,010

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

STANLEY M. URYNOWICZ JR.)
Administrative Patent Judge)
)
)
)
)
)
MICHAEL R. FLEMING) BOARD OF PATENT
Administrative Patent Judge) APPEALS AND
) INTERFERENCES
)
)
)
JOSEPH F. RUGGIERO)
Administrative Patent Judge)

Appeal No. 1999-0594
Application No. 08/434,010

SU/RWK
DAVID A.FOX
CANTOR COLBURN LLP
55 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002