United States Patent [19]

Brown et al.

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[45] **Date of Patent:** **Feb. 2, 1999**

[54] **MOTION CONTROL SYSTEMS**

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[73] Assignee: **Roy-G-Biv Corporation**, White Salmon, Wash.

[21] Appl. No.: **656,421**

[22] Filed: **May 30, 1996**

[51] **Int. Cl.^{6}** **G05B 19/18**
[52] **U.S. Cl.** **364/167.02**; 364/130; 364/191; 364/474.28; 395/500
[58] **Field of Search** 364/167.01, 191, 364/474.22, 474.21, 239, 230, 474.23, 474.24, 474.25, 474.26, 130, 474.28; 395/681, 651, 500, 680, 800, 828

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[57] **ABSTRACT**

A system for motion control in which an application is developed that is independent from the actual motion control hardware used to implement the system. The system comprises a software system that employs an application programming interface comprising component functions and a service provider interface comprising driver functions. A system programmer writes an application that calls the component functions. Code associated with the component functions relates these functions to the driver functions. A hardware designer writes driver code that implements the driver functions on a given motion control hardware product. The driver functions are separated into core and extended driver functions. All software drivers implement the core driver functions, while the software drivers need not contain code for implementing the extended driver functions. If the software driver does not contain code to implement an extended driver function, the functionality of the extended driver function is obtained through a combination of core driver functions. The system programmer may also select one or more streams that allow the control commands to be communicated to, and response data to be communicated from, motion control hardware.
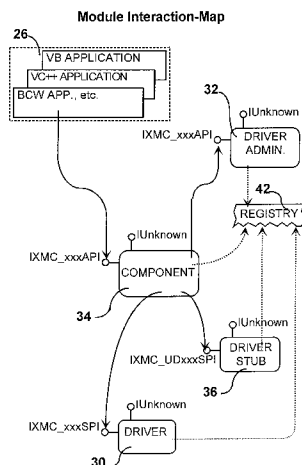
14 Claims, 64 Drawing Sheets

Module Interaction-Map

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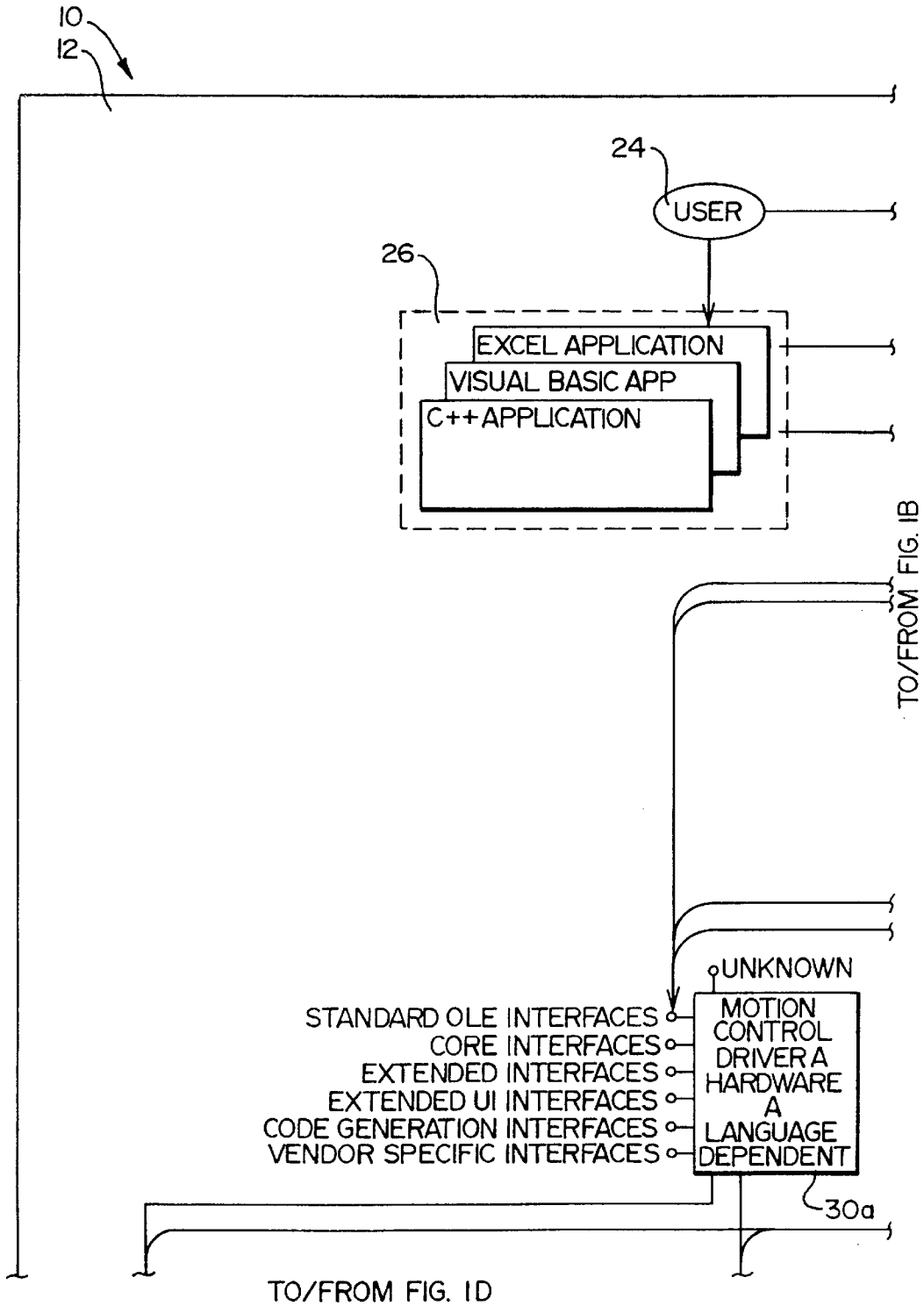Oregon Micro Systems Product Guide, No Date.

FIG. IA

10

12

24

USER

26

EXCEL APPLICATION

VISUAL BASIC APP

C++ APPLICATION

TO/FROM FIG. IB

○ UNKNOWN

STANDARD OLE INTERFACES ○—
CORE INTERFACES ○—
EXTENDED INTERFACES ○—
EXTENDED UI INTERFACES ○—
CODE GENERATION INTERFACES ○—
VENDOR SPECIFIC INTERFACES ○—

MOTION
CONTROL
DRIVER A
HARDWARE
A
LANGUAGE
DEPENDENT

30a

TO/FROM FIG. ID

FIG. 1B

FIG. IC

TO/FROM FIG. IB

22

STANDARD OLE INTERFACES—

CORE INTERFACES—

EXTENDED INTERFACES—

EXTENDED UI INTERFACES—

CODE GENERATION INTERFACES—

VENDOR SPECIFIC INTERFACES—

UNKNOWN

MOTION
CONTROL
DRIVER C
HARDWARE
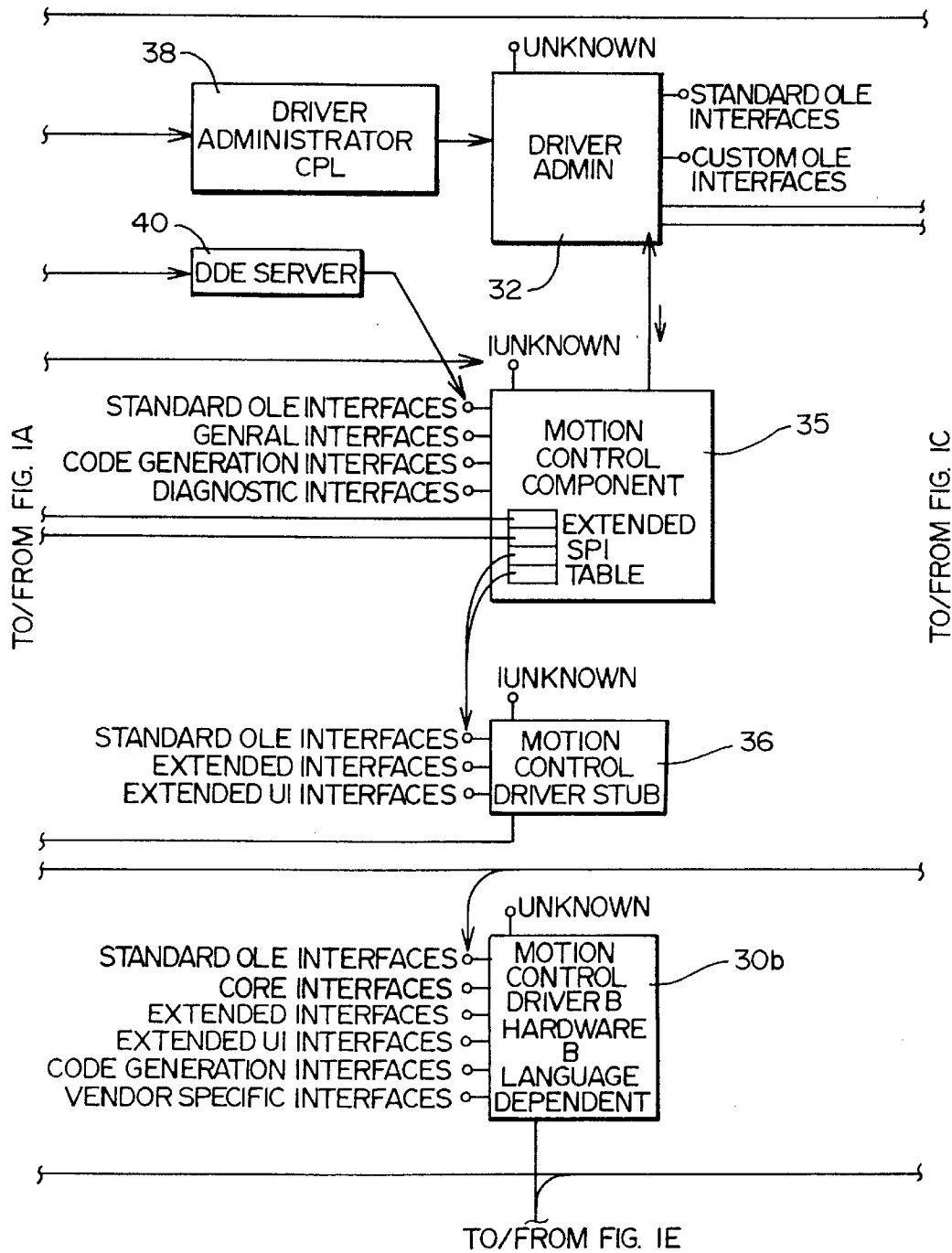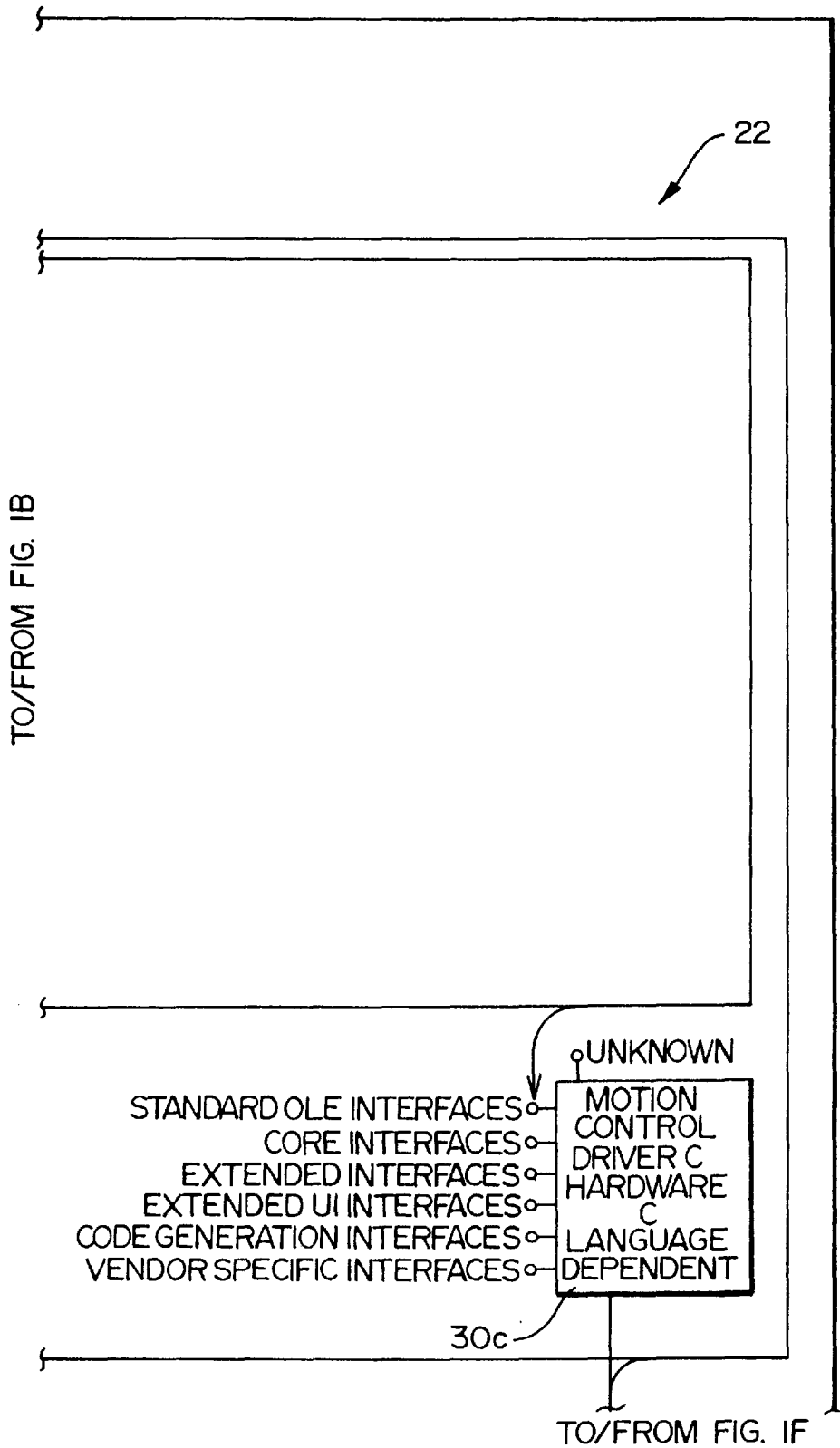C
LANGUAGE
DEPENDENT

30c

TO/FROM FIG. IF

DOCKET ALARM

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