PROCESS
WITH SAFETY MEANS
.Guard

WITH MEANS TO REGULATE OPERATION
BY MEANS OF REPLACEABLE
INFORMATION SUPPLY (E.G.,
TEMPLET, TAPE, CARD, ETC.)
.Replaceable information
comprising tool location
..Including determining optimum
tool access path

WITH CONTROL MEANS ENERGIZED IN
RESPONSE TO ACTIVATOR
STIMULATED BY CONDITION SENSOR
.Responsive to tool identifying
information
..Identifying information on tool
or tool holder
.Responsive to tool
..Including means to monitor and
control, i.e., adaptive
machining

WITH SIGNAL OR INDICATOR
WITH MEANS TO CONDITION OR ADJUST
TOOL OR TOOL SUPPORT
WITH MEANS TO TRANSFER WORK
..Including machine tool or
component
.Rotary spindle machine tool
(e.g., milling machine,
boring, machine, grinding
machine, etc.)
..Tool having specific mounting
or work treating feature
..Including means for angularly
orienting tool and spindle
.....Spindle angularly oriented to
align with tool
..Tool changer between spindle
and matrix
..Including intermediate tool
changer
.....Intermediate tool changer
includes tool holder pivotable about
axis
.....Tool holders pivotable with
respect to each other
.....Tool holders pivotable about
plural nonparallel axes
.....Linearly movable tool
holders
.....Extensible tool holders
.....Translational axis
.....Distinct tool changer for
each tool
.....Including intermediate tool
changer
.....Linearly movable tool holder
.....Tool holder pivotable about
plural nonparallel axes
.....Including linearly
translatable tool changer
(e.g., shuttle, ram, etc.)
.....Plural tool holders
.....Orthogonally translatable
..Direct tool exchange between
spindle and matrix
.....Spindle comprises tool changer
.....Matrix indexes selected tool
to transfer position
.....Including means to project
tool from matrix

TOOL TRANSFER TO OR FROM MATRIX
..Matrix including means to latch
tool
Matrix including means to project tool for transfer

Rectilinear

Pivoting

Plural matrices

Including tool replenishing

Including tool pot or adapter

Indexing matrix

Rotary disc

Chain or belt

MISCELLANEOUS

CROSS-REFERENCE ART COLLECTIONS

900 GRIPPING PORTION ENGAGES TOOL SIMULTANEOUS WITH TOOL ROTATING IN SPINDLE

901 ROBOT END EFFECTORS

902 TOOL GRIPPERS

FOREIGN ART COLLECTIONS

FOR CLASS-RELATED FOREIGN DOCUMENTS

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