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|------|-----------------------------------|--|-------------------|
| [19] | INTELLECTUAL PROPERTY PHILIPPINES | | |
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| [54] | Title: | POPPET PIN EJECTOR | |
| [71] | Applicant(s): | NAT MACHINERY LLC | |
| [72] | Inventor(s): | HAY THOMAS E CARPER JEFFREY W | |
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| [57] | Abstract: | A tool for a progressive forming machine comprising an assembly having a workpiece shaping cavity symmetrical about an axis and including an end wall transverse to the axis, a conical bore open to the end wall and centered on the axis, the sides of the conical bore being described by a relatively small angle relative to the axis, and an ejector pin for forcing workpieces from the cavity, the ejector pin having an end face and a conical body portion rearward of the end face, the conical body portion having an external surface matching a surface of the conical bore. | |

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POPPET PIN EJECTOR

BACKGROUND OF THE INVENTION

[1] The invention relates to tooling for cold forming
5 metal parts and, more specifically, to improvements in
ejector pins for tool cavities.

PRIOR ART

[2] High speed progressive formers typically convert a
10 blank or workpiece, starting as a sheared length of wire,
into a part of complex shape. The shaping process involves
transfer of the workpiece between progressive workstations.
At a typical workstation, the workpiece is struck by a tool
on a reciprocating ram while it is positioned at a
15 stationary tool on a bolster. Where a tool is in the form
of a cavity, an ejector pin is used to ensure that the
workpiece is pushed free of the cavity after it has been
shaped in the cavity.

[3] Conventionally, an ejector pin is a cylindrical
20 element with a flat end that forms part of the cavity wall
during the forming blow and thereafter is forced into the
cavity to positively displace the workpiece. A problem
associated with a conventional ejector pin is the tendency
of the pin to compress longitudinally or axially when
25 subjected to the high forming forces on the workpiece.
Displacement of the pin face is typically reflected as an
unintended step in the surface of the workpiece. Abrupt
changes in the workpiece surface contour are visually
objectionable and can lead to defective finished parts. A
30 prior attempt to eliminate variation in the position of the
ejector pin face involved making the pin end with a

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WHAT IS CLAIMED IS:

1. A tool for a progressive forming machine comprising an assembly having a workpiece shaping cavity symmetrical about an axis and including an end wall transverse to the axis, the end wall having a slope change in a zone symmetrical about the axis forming a centering and stabilizing pocket for a workpiece, a conical bore open to the end wall and centered on the axis, and an ejector pin for forcing workpieces from the cavity, the ejector pin having an end face and a conical body portion rearward of the end face, the conical body portion having an external surface matching a surface of the conical bore, a mouth of the bore and end face of the ejector pin being spaced radially inwardly from the pocket.

2. A tool as set forth in claim 1, wherein the end wall has inner and outer circular areas forming the pocket, the inner area being closer to a plane perpendicular to the axis than the outer area.

3. A tool as set forth in claim 2, wherein the inner area is concave.

4. A tool as set forth in claim 3, wherein the inner area is described by an angle of about 7 degrees from a plane perpendicular to the axis.

5. A tool for a progressive forming machine comprising an assembly having a workpiece shaping cavity symmetrical about an axis and including an end wall

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2. A tool as set forth in claim 1, wherein the end wall has inner and outer circular areas forming the pocket, the inner area being closer to a plane perpendicular to the axis than the outer area.

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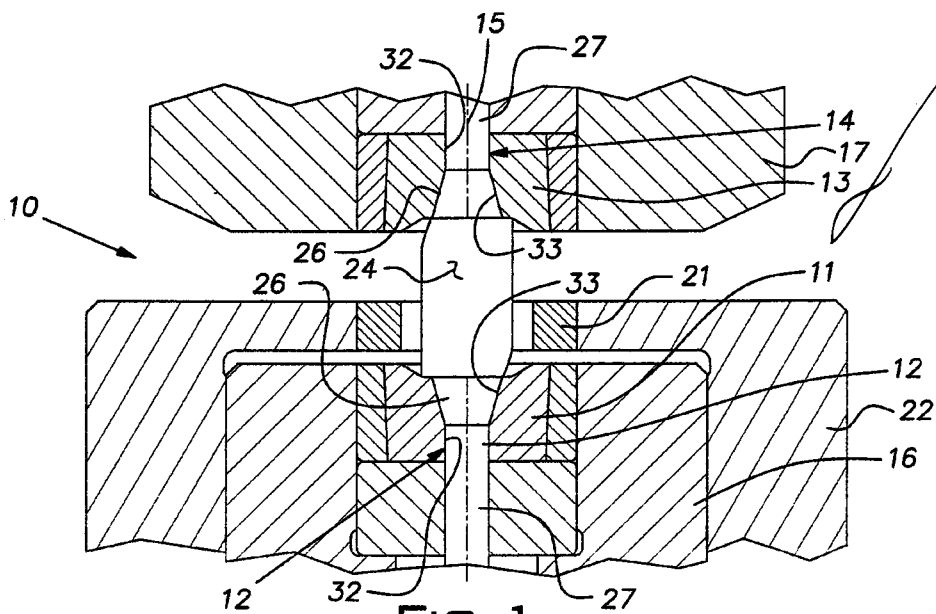


FIG. 1

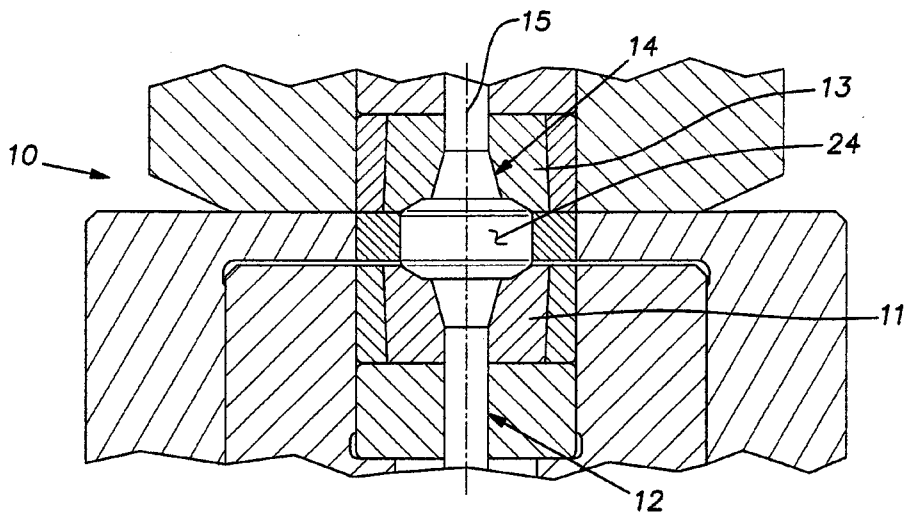


FIG. 2

NATIONAL MACHINERY LLC

Applicant

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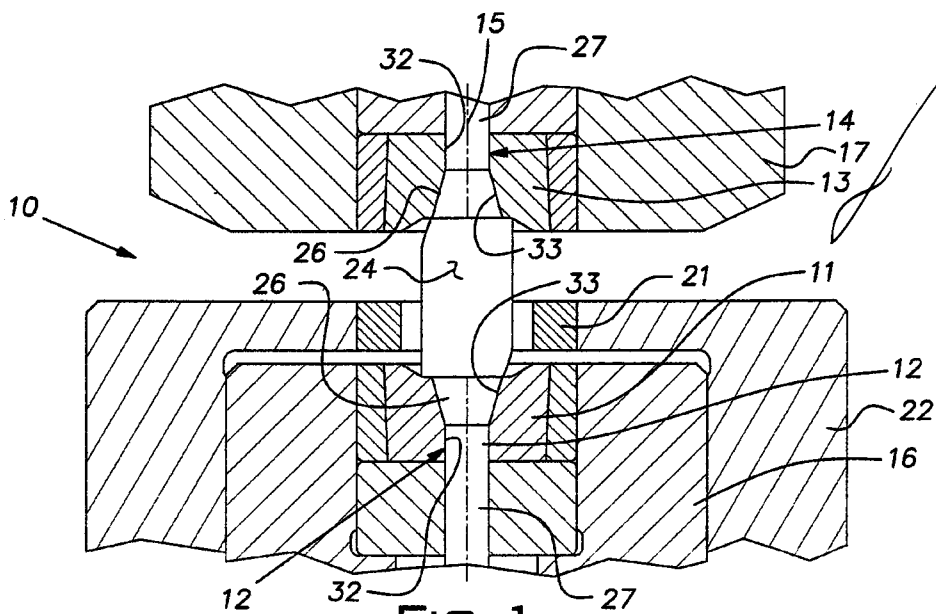


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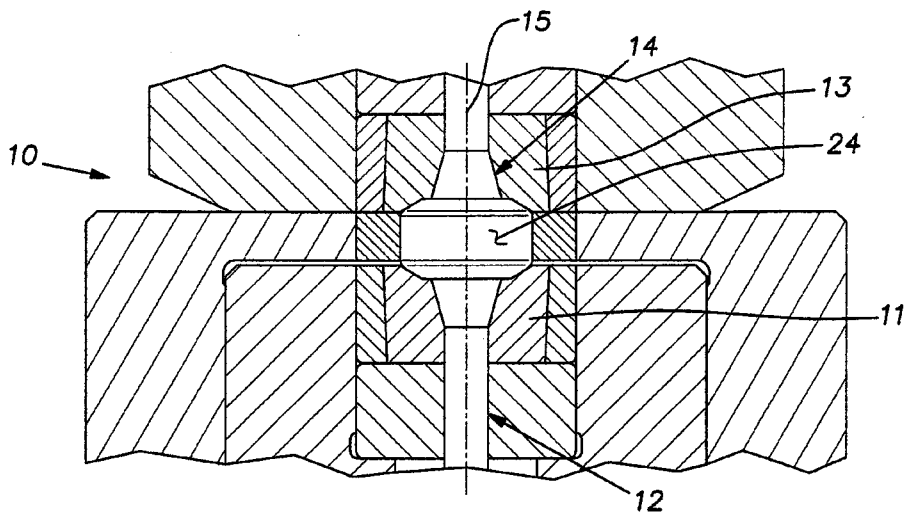


FIG. 2

NATIONAL MACHINERY LLC

Applicant

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