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**Matsunaga et al.**

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(54) **TOOL LOCKING SYSTEM**

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**Related U.S. Application Data**

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(51) **Int. Cl.**  
**B23B 3/36** (2006.01)  
**B23B 29/00** (2006.01)

(52) **U.S. Cl.** ..... **82/152; 82/157**

(58) **Field of Classification Search** ..... 82/152, 82/151, 154, 157; 72/238, 229; 29/65, 40, 29/41, 48.5 R  
See application file for complete search history.

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(57) **ABSTRACT**

A locking system for securing tools on an arbor. The locking system has a collar attached to the arbor, with the collar spaced from the tooling. A nut is placed over the collar and positioned next to the tools. The nut is then rotated to secure the nut between the collar and the tools.

**1 Claim, 3 Drawing Sheets**

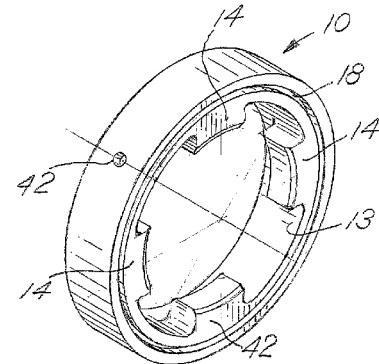
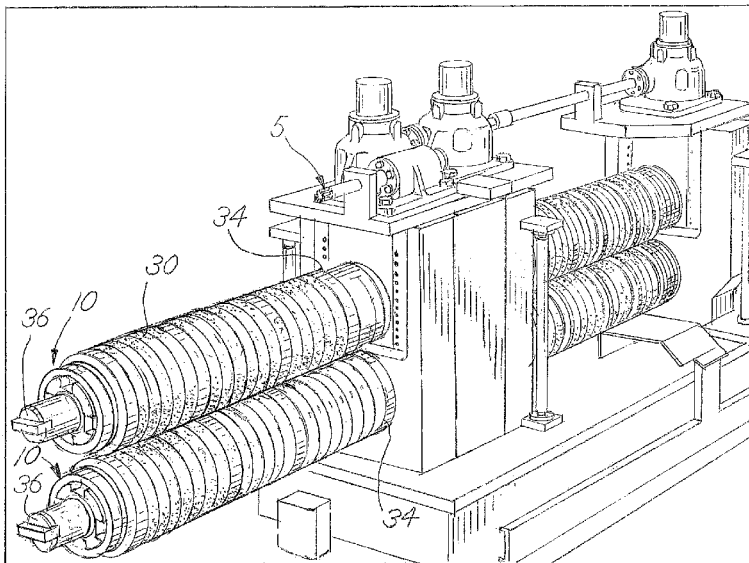


FIG. 1

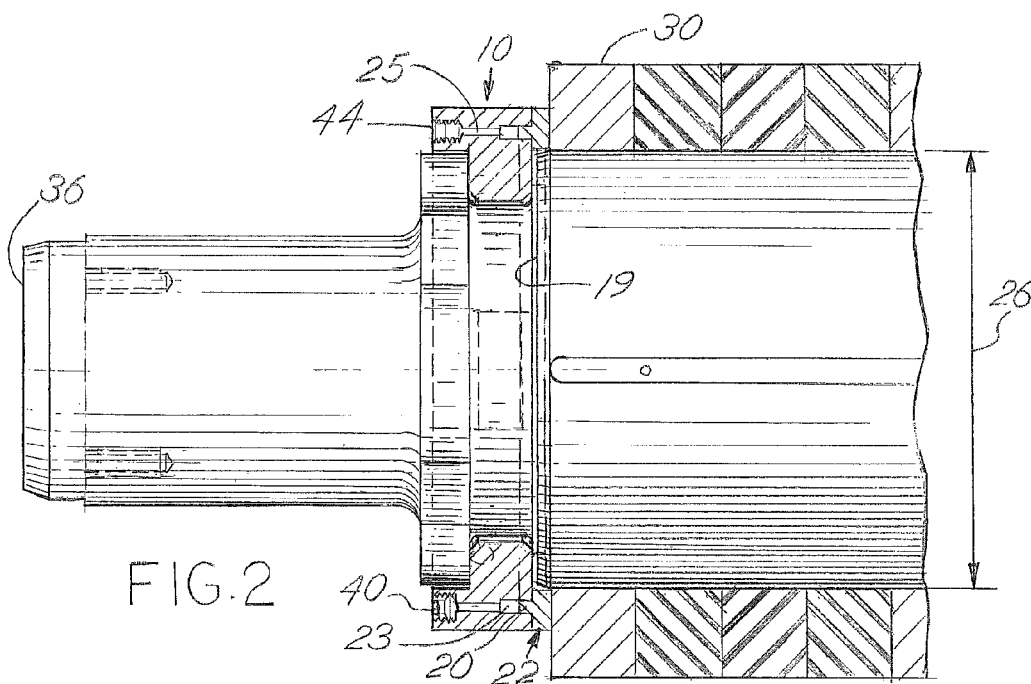
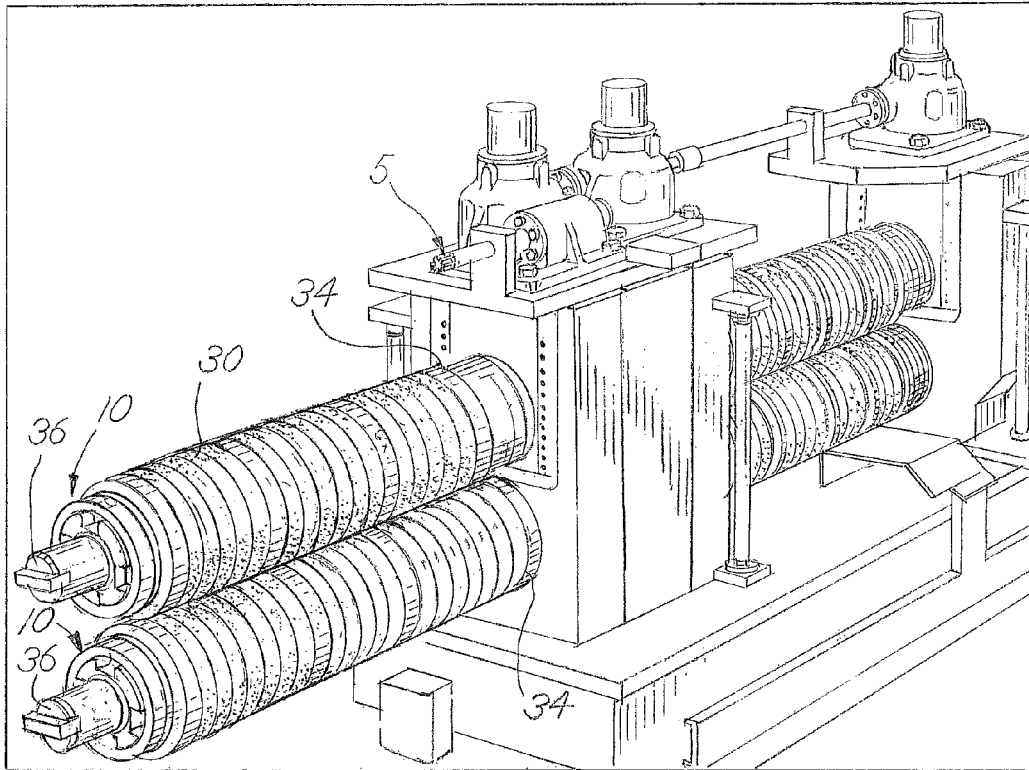


FIG. 2

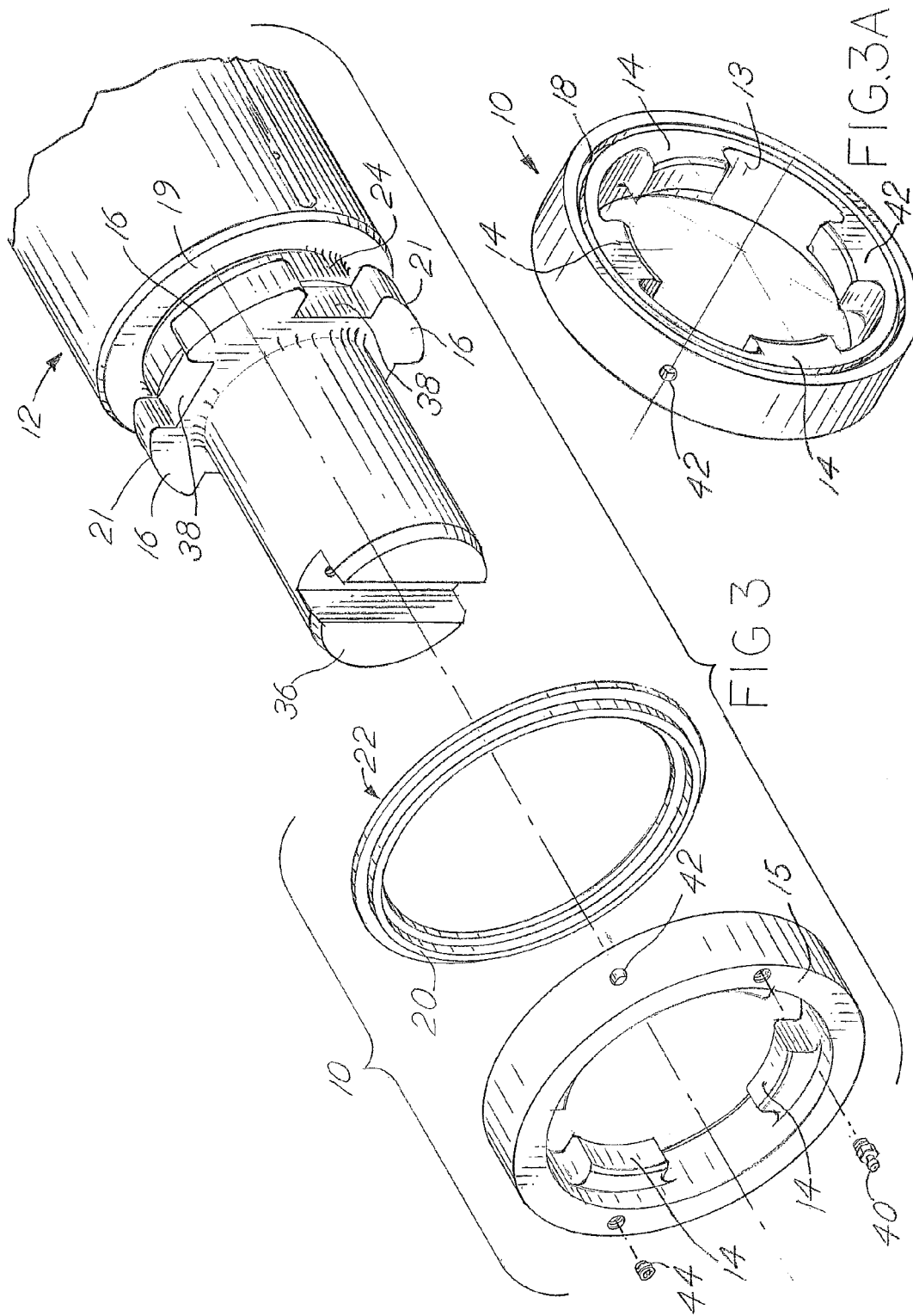


FIG. 4

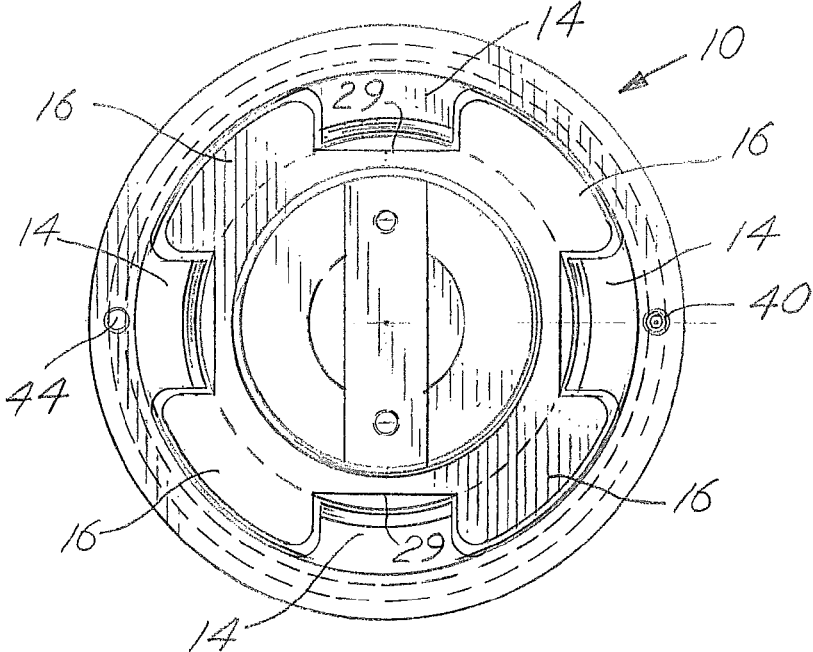
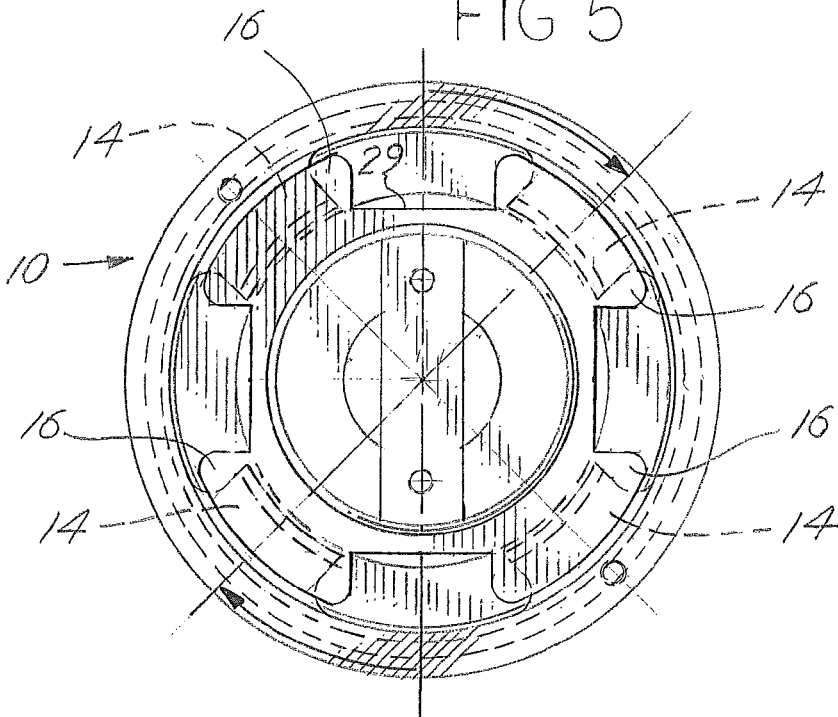


FIG 5



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**TOOL LOCKING SYSTEM****CROSS-REFERENCE TO RELATED APPLICATION**

This is a continuation of U.S. patent application Ser. No. 11/754,100 filed May 25, 2007.

**BACKGROUND OF THE INVENTION**

Tooling on roll forming and slitter arbors has traditionally been held onto the arbor by using a threaded nut on the end of the arbor that receives the tooling. The threaded nut must have mating threads that are machined into the end of each arbor. These threads on the arbor are subject to damage as tooling is loaded onto the arbor, the nut is threaded upon the arbor or removed from the arbor, or just by being exposed in the work place. Damaged threads can require costly maintenance to restore to a working condition. Therefore, there is a need for a more robust system to hold tooling on arbors that does not require threads.

**SUMMARY OF THE INVENTION**

The present invention is an arbor tool locking system. The system uses a flanged nut that rotatably engages a keyed collar on the arbor. The collar forms a part of the arbor and is spaced from that part of the arbor that carries the tooling. The nut is slid over the collar and partially rotated to cause the nut flanges to be positioned between the collar and the tooling upon the arbor with the nut compressed against the tooling.

An object of the invention is to provide a locking mechanism to hold tooling on arbors without the use of screw threads.

Another object of the invention is to provide a locking mechanism for tooling of a roll former and slitter which can be economically maintained and of rapid operation.

Still other objects of the invention will become apparent upon reading the following description.

**BRIEF DESCRIPTION OF THE DRAWINGS**

A preferred embodiment of this invention has been chosen wherein:

FIG. 1 is a perspective view of a slitter with tooling stacked and locked on the arbors;

FIG. 2 is a fragmentary side view of an arbor end in partial sectional form;

FIG. 3 is a perspective exploded view of the slitter tool lock;

FIG. 3A is a perspective view of the nut of the tool lock shown in assembled form;

FIG. 4 is a view of the end of an arbor with the nut installed in its released position; and

FIG. 5 is a view of the end of an arbor with the nut installed in its locked position rotated 45 degrees from the position shown in FIG. 4.

**DETAILED DESCRIPTION OF INVENTION**

The tool locking system of this invention includes a nut **10** and a collar **11** forming a component of arbor **12**. Arbor **12** is shown as forming a part of a slitter **5**. The nut **10** has equally radially spaced flanges or bosses **14** that protrude toward the inside of the nut as shown in FIG. 3A. Flanges **14** are inwardly spaced from outer edge face **15** of the nut. Nut **10** has an annular groove **18** formed in its inner edge face **17** as shown

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in FIG. 3A. The annular groove **18** in the nut receives a pressure ring **22**. A bore **23** extends in nut **10** into groove **18** behind ring **22**. A grease zerk fitting **40** is located in bore **23** at face **15**. Pressure ring **22** forms what is also known in the trade as a Jetnut. A ball check valve **44** is also located at face **15** in a bore **25** into groove **18**. Collar **11** is attached to or forms an integral part of arbor **12** and includes a plurality of equal radially spaced coplanar flanges **16** spaced just slightly more than the thickness of nut flanges **14** from shoulder **19** of the arbor **12**.

The outer diameter of collar **11** at the ends **21** of the flanges **16** is less than the major diameter **26** of the arbor to allow tooling **30**, in the form of cutters and spacers, to pass over the flanges **16** at the end of the arbor **12**. This outer diameter of collar **11** is also less than the inner diameter of nut inner surface **13**.

Tooling **30** is stacked on the arbors **12**, as shown in FIG. 1, until the arbors are full from the inner shoulder **34** to the outer shoulder **19** of the arbor. FIG. 2 shows a sectional view of a full arbor **12** near the open end **36** of the arbor. Once the arbor **12** is full of tooling **30**, the nut **10** is inserted upon the open end **36** of the arbor with the flanges **14** on the nut **10** lining up with the spaces **38** between the flanges **16** on the arbor **12**. The nut **10** is pushed onto the arbor end until pressure ring **22** preferably abuts arbor shoulder **19**. This position is shown in FIG. 4 and is the nut's unlocked position. The depth of flanges **14** are such that the flanges clear the root face **29** of collar **11** between flanges **16**. The nut **10** is then turned 45 degrees to its locked position, as shown in FIG. 5, so that the flanges **14** of the nut are then between the flanges **16** of the collar and shoulder **19** of the arbor **12**. A hole **42** is provided in the side of the nut **10** in which a rod or spanner wrench may be inserted to assist in turning the nut **10**. In the 45 degree rotated position shown in FIG. 5, a grease gun is then used to force grease into groove **18** of the nut through fitting **40**. The pressurized grease causes the pressure ring **22** to forcefully press against the tooling **30**, thereby securing the tooling **30** in place on the arbor and locking the nut **10** against collar **11**. To unlock the nut **10**, check valve **44** is open to release the pressure upon the grease in chamber **23** which causes pressure ring **22** to no longer forcefully push against the tooling **30**. This allows nut **10** to be turned into its released position, as shown in FIG. 4, where it can be removed to free the tooling **40** for replacement.

The above described invention is not to be limited to the details given but may be modified within the scope of the following claims.

What is claimed is:

1. A locking system for securing tooling on a slitter arbor comprising:

a collar spaced from said tooling and spaced flanges on said collar, and

a nut having spaced internal flanges, said nut being slidable over said collar with said internal flanges passing between said collar flanges as said nut is slid over said collar into a first position wherein said nut is positioned adjacent said tooling and said nut being rotatable relative to said collar from said first position into a second position wherein the internal flanges are secured between the collar and the tooling, said nut having a groove, said groove receiving a pressure ring to form a chamber within said nut, said chamber receiving a pressure forming source to extend said pressure ring apart toward said tooling on said arbor when said nut is in its second position.