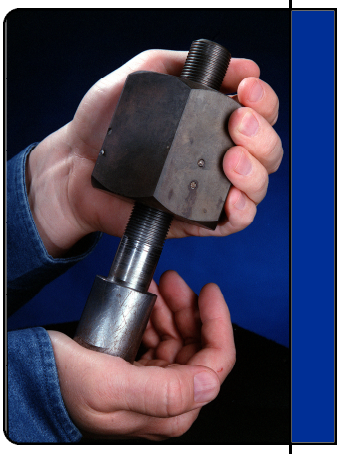
Technology *Opportunity:* Quick Connect Fastener

A quick-connect, slow-disconnect nut and bolt are being offered by NASA for technology transfer. The designs of the nut and the bolt are available together or separately. The design permits the nut to be installed simply by pushing it onto a standard bolt or threaded stud. Once installed, it can be removed only by unscrewing it in the manner of a conventional nut. The bolt operates in a similar manner. It is installed by pushing it directly into the hole on a nut. It is unscrewed in the same manner as a conventional bolt.

Potential Commercial Uses

The new nut and/or bolt may be used in the same situations as conventional nuts and bolts. The new design is of special benefit in situations where connections must be made quickly. The device can be used throughout industry.



Benefits

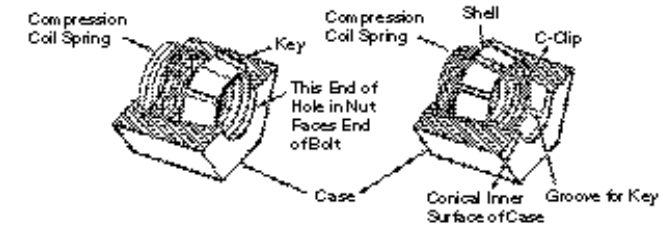
The new designs are as portable as conventional nuts and bolts, are as easy to store, have unlimited shelf life, and can be used in the same conditions as conventional nuts and bolts. The design is advantageous in situations where speed is desirable such as changing racing car tires, emergencies, difficult working conditions, etc. The devices are as strong as conventional nuts and bolts and are virtually fail safe.

The Technology

The nut has a hexagonal outer case which resembles an ordinary nut but which holds several shells in its hole. Each shell has a key to protrude radially outward and engage a lengthwise groove in the case. Except for the gaps between the shells, the inner surfaces of the shells constitute a standard threaded surface. Two “C-shaped” spring clips snap into a pair of grooves at the ends of the shells. These clips push the shells outward against the conical inner surface of the hole, thereby pushing axially toward the wide end of the cone. A coil spring provides sufficient force to overcome the axial force from the C-clips, pushing the shells axially toward the narrow end of the cone where they are stopped by a flange.

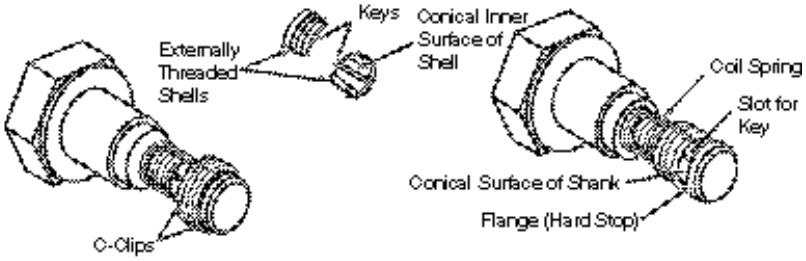
When inserted onto a bolt or stud, the shells slip past the external threads, then the coil spring causes the shells to move radially inward/more securely. The nut can be removed or tightened in the usual manner. The bolt has circumferential shells designed to constitute a standard external thread. Clips and springs hold the shells against the conical surface of the shank. When the bolt is pushed into a threaded hole, the design allows an engagement of the bolt’s threads with the nut, and the bolt is positively retained in the hole. Pulling the bolt only drives the shells more firmly into the thread. The bolt can be tightened or loosened in the conventional manner.

Quick-Connect Fastener



Shells Shown in Normal Position

Shells Shown Pushed Axially Against Coil Spring



Threads in normal position, as when standing freely or during engagement in threaded hole

Threads pushed back, as during insertion into threaded hole

Options for Commercialization

The technology is patented by NASA and is available for transfer to industry, particularly for use in applications where there is a need to make rapid, secure connections in difficult working conditions. Possible use scenarios include lug nuts for racing cars, making emergency repairs to damaged vessels, reinforcing damaged structures, and working in hazardous environments where a maximum amount of work for the least possible exposure time is desirable such as in the vacuum of space.

Patent Number

- Nut—5,340,252
- Bolt—5,634,754

Contacts

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