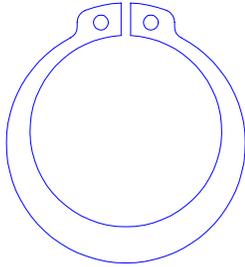


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TRUE LOCK, LLC

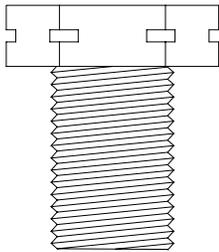
ADVANCED FASTENER TECHNOLOGY
THE NEXT GENERATION

TRUE LOCK System for M1 Abrams Tank



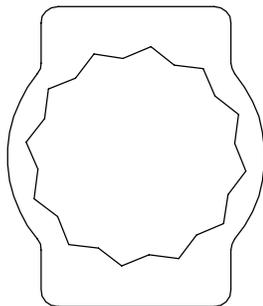
Snap Ring

Securely holds retaining plate in place.



Grooved Wedge Bolt

Same as existing bolt with grooves cut into each point to hold snap ring.



Retaining Plate

Fits over tightened wedge bolt into recess on top of end connector.

HOW DOES A ONE DOLLAR BOLT STOP A SEVEN MILLION DOLLAR TANK?

Introducing the TRUE LOCK safety fastening system designed for critical nut and bolt applications.

Today's armored vehicles are a direct result of over fifty years of evolutionary development. The lessons learned in battle have been combined with modern technology to produce the world's finest armored fighting machines, as clearly demonstrated in the Gulf War.

The armament system on the M1 Abrams is a marvel of electronics that gives it unparalleled targeting accuracy and firing capability. The powerful engines produce impressive speeds and the protective armor can withstand considerable pounding from the enemy. The design of the track and suspension have made the modern tank a truly all terrain vehicle capable of on and off-road travel.

With all of the numerous developments that have taken place over time, there is still one area that has never been

improved. There remains one problem that, until now, has never been solved.

The performance of a tank in battle is dependent upon mobility. A track failure can bring the modern armored vehicle to a grinding halt and place the crew at risk.

The track is held on by end connectors, which are secured by wedges and fastened with bolts. Wedge bolts are subjected to tremendous forces throughout the full range of motion of the track. These forces are acting to loosen the wedge bolts.

The performance of a tank in battle is dependent upon mobility.

Standard operating procedures have been adopted to help combat this situation. The bolts are systematically tightened during the installation of the track and again after 20 miles of travel. The wedge bolts are individually torqued, and sometimes even overtightened, by maintenance

personnel at the next available opportunity. Tank crews are taught to constantly inspect end connectors for loose wedge bolts, which is not a simple task. Missing bolts are easy to notice, loose bolts are not.

Wedge bolts are subjected to tremendous forces throughout the full range of motion of the track.

This system of checks and rechecks, tightening and retightening of wedge bolts is intended to identify a potentially dangerous situation and remedy it before it progresses to the point where an end connector is lost and the track comes apart. All of these procedures, however, are just a treatment for the symptoms. They do nothing to solve the problem, nothing to prevent the bolts from coming loose in the first place.

The retightening of wedge bolts comes at the cost of a tremendous number of man-hours. This is time that could

**TRUE LOCK
THE ONLY
ACTIVE LOCKING
SYSTEM FOR
NUTS AND BOLTS**

be spent performing needed maintenance. This is time that could be spent maneuvering on the range or training on the armament system. This is time that, in battle, is far too valuable to risk the lives of the crew by having them outside of the protective armor.

The solution is a lock that will prevent wedge bolts from rotating loose. This device should be an active locking system that does not rely on

The retightening of wedge bolts comes at the cost of a tremendous number of man-hours.

the tightness of the bolt itself, nor requires overtorquing. The device should be simple to install and remove, and be reusable. This is the patented **TRUE LOCK** safety fastening system.

Our system consists of a retaining plate, a snap ring, and grooved wedge bolts. The system can be retrofitted to existing tracks or included into new vehicle designs.

The wedge bolts have been adapted from those currently being used, except that a groove has been machined into each point to fit

the thickness and size of the snap ring. Each bolt is installed and tightened as normal. Further retightening is not required, nor do the bolts have to be overtorqued.

The retaining plate is then slipped over the head of the wedge bolt. Cutouts in the plate are similar to a socket wrench and match the hex head on the bolt. These cutouts are rotated slightly to allow for a high degree of adjustment and the retainer can even be flipped over to allow for a better fit. The retainer has two shoulders which fit into the recess on the top of the end connector.

The retaining plate is then secured with the snap ring. The system is now in place. The snap ring locks the retainer into the recess of the end connector and the retainer locks the wedge bolt and prevents it from rotating loose. The time spent

The solution is a lock that will prevent wedge bolts from rotating loose.

on constantly retightening the wedge bolts has been eliminated and the danger of a track related accident due to a lost end connector has been greatly reduced. Routine inspections of

the track are still necessary, but they are far easier and can be done visually, because if the retainer is in place, the wedge bolt **cannot be loose**. **TRUE LOCK** eliminates the retightening of bolts. Safety has been improved and time can be better utilized.

TRUE LOCK has been successfully tested on M1 tanks by the U.S. Army in Boise,

***TRUE LOCK**
eliminates the
retightening of
bolts.*

Idaho and by the Marine Corps at Twenty-nine Palms, California. The test results have shown that tanks with the **TRUE LOCK** system installed have not had any wedge bolts come loose and has significantly increased the life of the track.

Our system can be adapted to fit any size nut or bolt application from tiny eyeglass screws to heavy construction equipment.

TRUE LOCK is the perfect solution to critical areas where safety and reliability are concerns. The system also works extremely well on applications where the nut is used to secure an adjustable part, such as the axles and

wheel bearings on vehicles like the Humvee. The adjustment can easily be made and once locked in place with **TRUE LOCK** it will not loosen.

The system is also ideal for those critical fasteners in the aerospace industry where safety is vital. The fasteners currently used on aircraft in the wings, landing gear, engines, control surfaces and linkages, are either of limited

*Our reusable system
can be adapted to
any nut or bolt*

effectiveness or expensive or both. The use of wire ties is outmoded and prone to failure, and can be complicated to install and difficult to inspect.

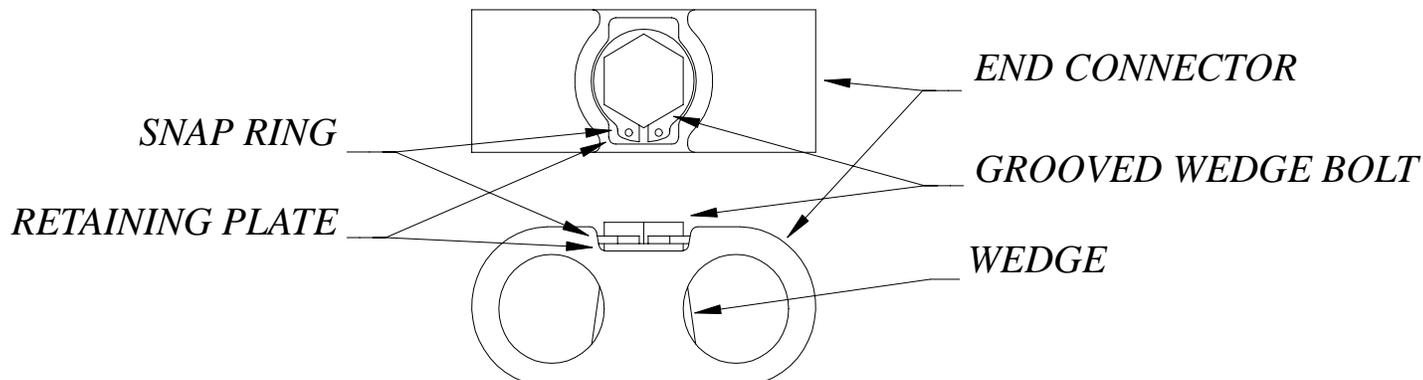
Please contact us for more information.

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in Advanced Fastener
Technology.***

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FAA STC PMA TSO

**SAE Committee Member
Spindle Nut Task Force**



TRUE LOCK System Installed on M1 Abrams Tank T158 End Connector