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Bolt Installation Tool for Tightening Large Nuts and Bolts

The problem:

Conventional torque wrenches cannot be used to tighten large nuts or bolts to structures that are too weak to withstand the specified torque. Normally when a torque wrench is applied to a bolt, the torque stress is transmitted to the structure. As a result, weak structures often crack before the proper torque level is reached.

The solution:

With a new bolt installation tool, large bolts and nuts are accurately tightened to structures without damaging torque stresses.

How it's done:

There are two models of the bolt installation tool: one is rigidly mounted and the other is hand held. Each model includes a torque-multiplier unit.

Figure 1 shows the rigidly mounted model. In operation, torque provided by the torque wrench is applied to the bolt through a torque-multiplier and wrench socket. The torque thus generated by the friction between the bolt head and the top surface of

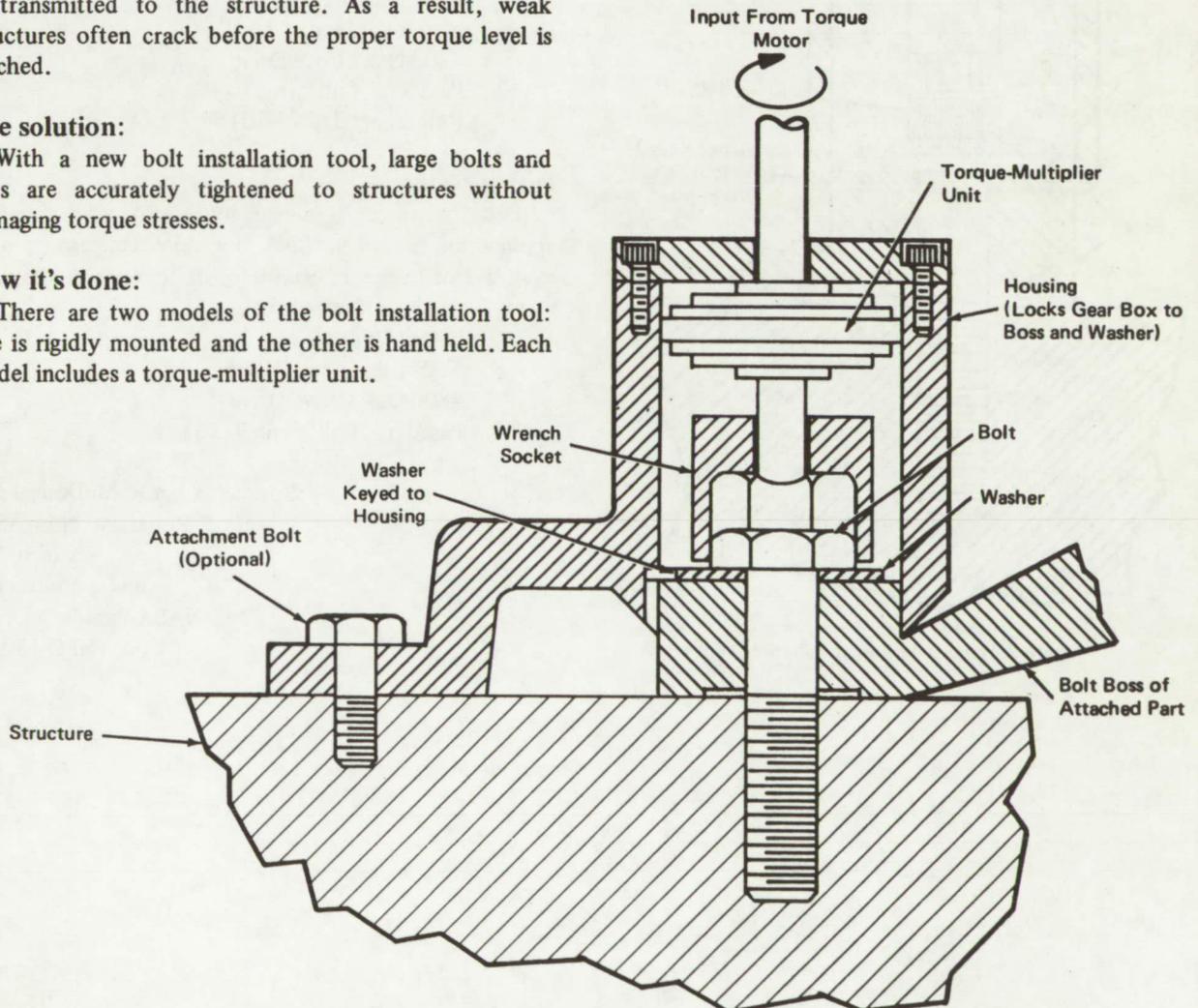


Figure 1. Rigidly-Mounted Bolt Installation Tool

(continued overleaf)

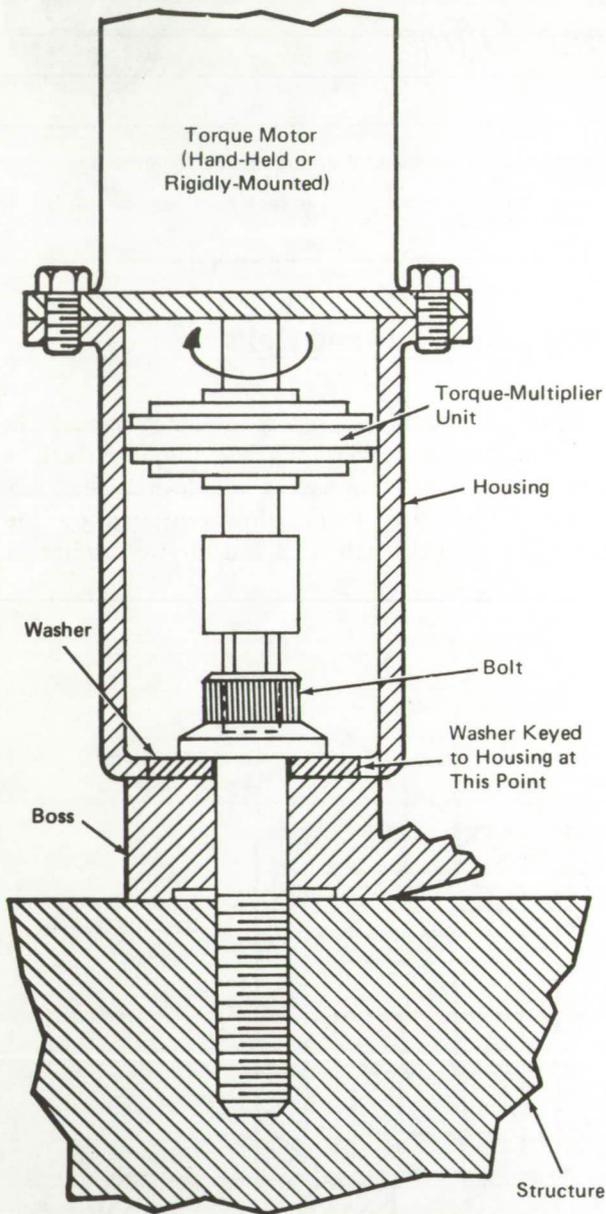


Figure 2. Hand-Held Bolt Installation Tool

the boss and the thread friction is transmitted to the tool housing. As a result, the only torque transmitted to the structure is from the reduced torque of the torque wrench. If the hand-held reaction bar is worked in unison with the torque wrench, no torque is transmitted to the structure.

The hand-held model, shown in Figure 2 as applied to an allen-head bolt, is identical in operation. The housing is keyed to the washer instead of the boss. The washer friction with the boss is larger than the total bolt friction and thus will not turn on the boss. This model is powered by a torque motor fastened to the housing. The reaction torque is taken internally between the housing and the case of the torque motor. There is no external torque from the device which may be freely hand held.

Note:

Requests for further information may be directed to:
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Patent status:

This invention is owned by NASA, and a patent application has been filed. Inquiries concerning non-exclusive or exclusive license for its commercial development should be addressed to:

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