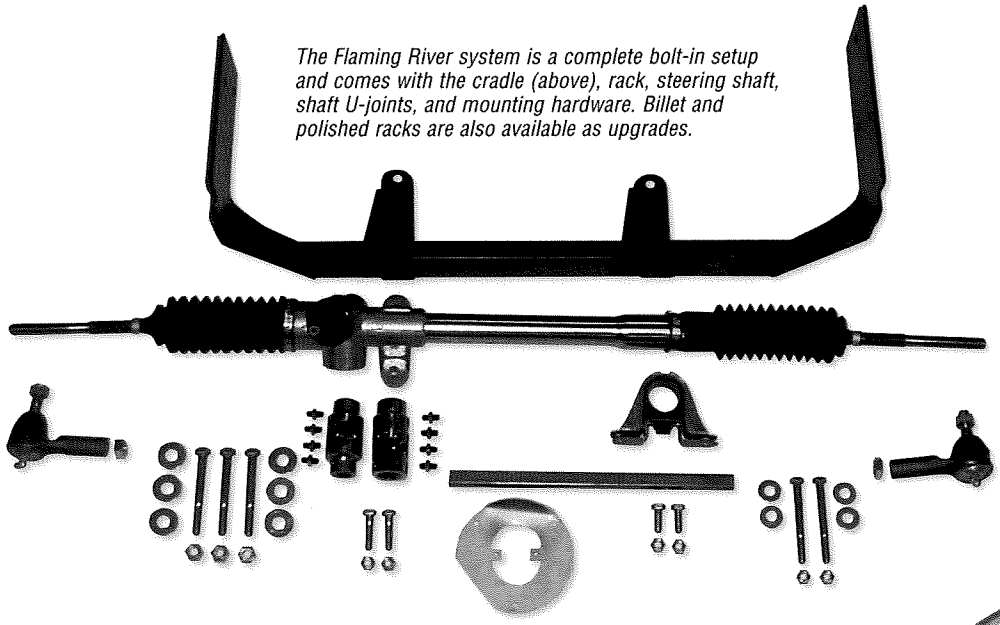
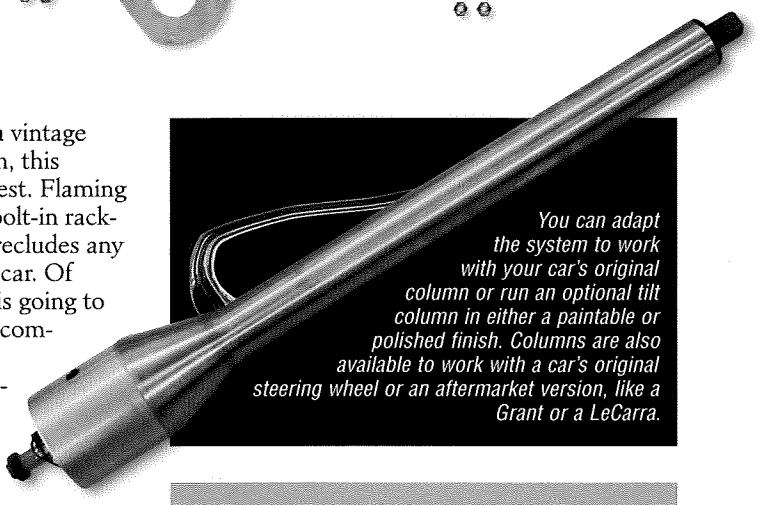
HOW-TO

# Install A Rack-and-Pinion Steering System



The Flaming River system is a complete bolt-in setup and comes with the cradle (above), rack, steering shaft, shaft U-joints, and mounting hardware. Billet and polished racks are also available as upgrades.



You can adapt the system to work with your car's original column or run an optional tilt column in either a paintable or polished finish. Columns are also available to work with a car's original steering wheel or an aftermarket version, like a Grant or a LeCarra.

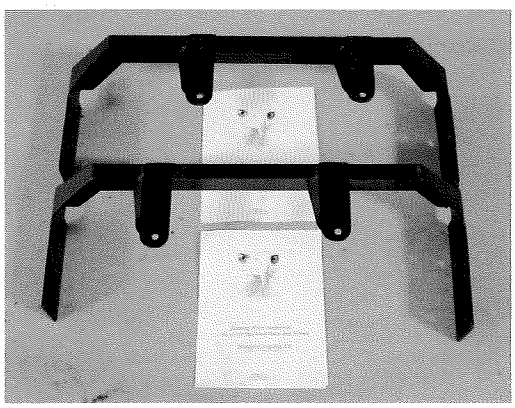
**With Flaming River's new bolt-in rack-and-pinion, it's now possible to have modern steering on '65-'70 Mustangs without cutting or welding**

*text and photos by Miles Cook*

For those of you who own a vintage Mustang and drive it often, this upgrade might be of interest. Flaming River recently released a bolt-in rack-and-pinion steering system that precludes any cutting, drilling, or welding to the car. Of course, any modern steering rack is going to provide greatly improved steering compared to the early Mustang's outdated worm-gear and tie-rod steering, which is the main reason for going to a rack-and-pinion setup.

If you want to make your car more enjoyable for the street or a twisty back road, this arrangement is ideal and is designed to fit '65-'70 Mustangs. The two main components are a slick mounting cradle and Flaming River's quick-ratio (16:1) manual rack. A tilt steering column is also available, which is a nice option for '65-'66 cars that never came factory equipped with a tilt wheel.

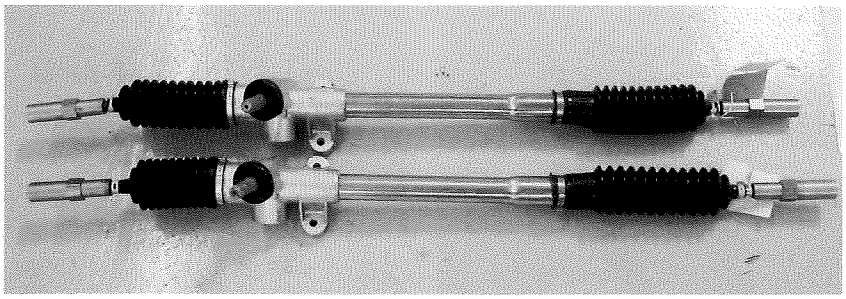
After having the standard kit on the market for a while, Flaming River made a system available for cars with headers. That was followed by another version for big-block cars that also might have headers. However, since it's impossible for Flaming River to offer a system for every engine, header, and transmission combination, first check to see if the kit will work in your car. Custom cradles can be made on a case-by-case basis, such as the one made for our unusual application.



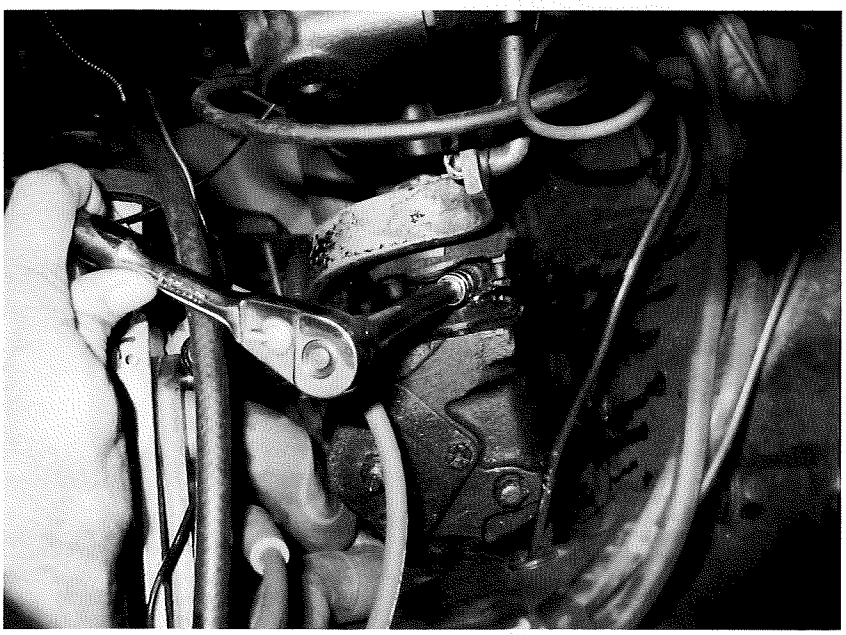
**1** *Shown here are the two cradies available for cars with stock exhaust (bottom) and with headers. Automatic versus manual transmissions need to be considered. For example, if your car has a manual transmission with the stock clutch linkage and clutch cross-shaft, unusual headers, an aftermarket oil pan, and an unusual engine such as a 351 Cleveland or an FE big-block, a custom cradle might be required and can be made by Flaming River. We had one made for our car because of its JBA headers and four-speed clutch linkage, which required offsetting the rack further than the standard header cradle.*

Our trusty '69 fastback was once again our subject car. With the rack-and-pinion, its 351W and four-speed clutch linkage made for something considerably more unusual than the typical '65-'66 car with a 289 and an automatic. Further muddying the waters are the car's JBA headers, which are something akin to a "medium-length" design. That is, they're not full-length headers, but they're longer than stock manifolds or compact shorty headers, so clearance issues with the system's steering shaft U-joints had to be addressed.

Flaming River made the system work on our car by building the custom cradle for our specific application. However, the following installation highlights, for the most part, pertain to installing the package in any '65-'70 Mustang.

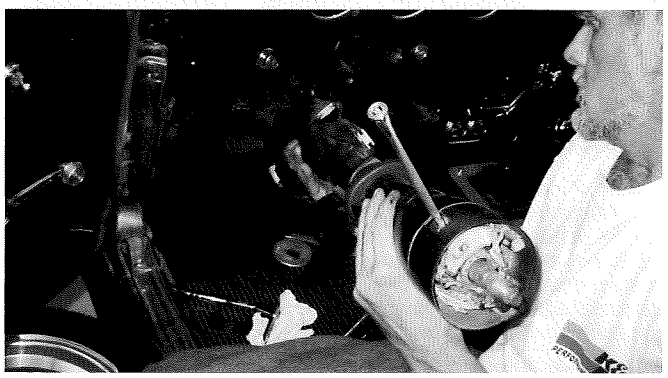


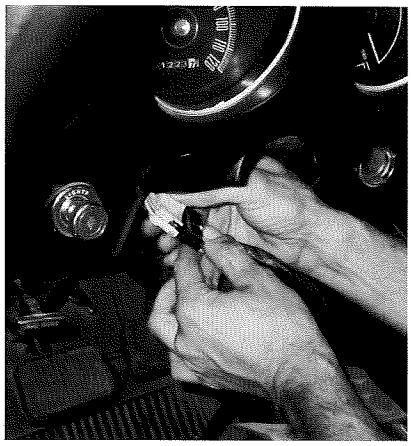
**2** *The header steering rack at the bottom is offset 1 inch, compared to the standard rack on top. Each comes with the correct corresponding cradle.*



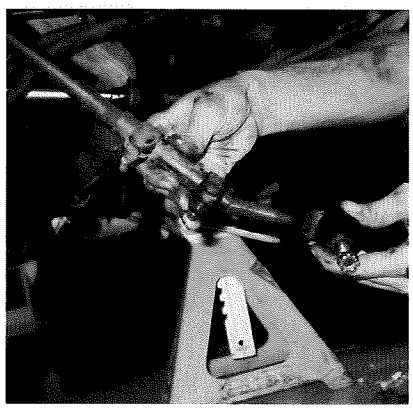
**3** *First, all the stock steering parts need to come off. We begin this process by disconnecting the steering box from the steering column under the hood in preparation for removal of the box and column.*

**4** *Next remove the column by removing the steering wheel and unbolting the column from the dashboard and floor.*

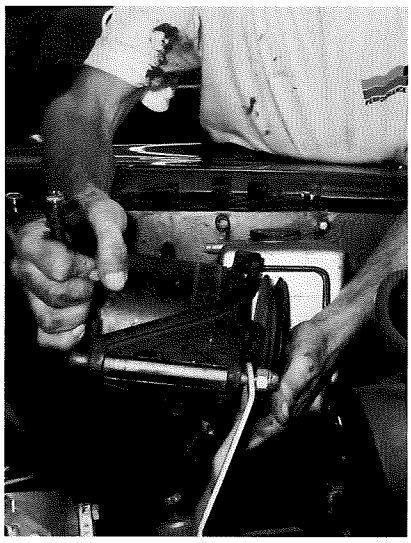




**5** *The steering column's wiring harness unplugs from the car, at which point the column can be completely removed.*



**6** *Moving underneath the car, remove the outer tie-rod ends from the spindles with a tie-rod-end puller or by carefully tapping the ends out of the spindle with a hammer. We removed these ends without a puller because they were recently replaced. Once separated from the spindle, unscrew the ends from the tie-rod sleeves. The outer ends will be used with the new steering rack. Procure new ones if needed.*

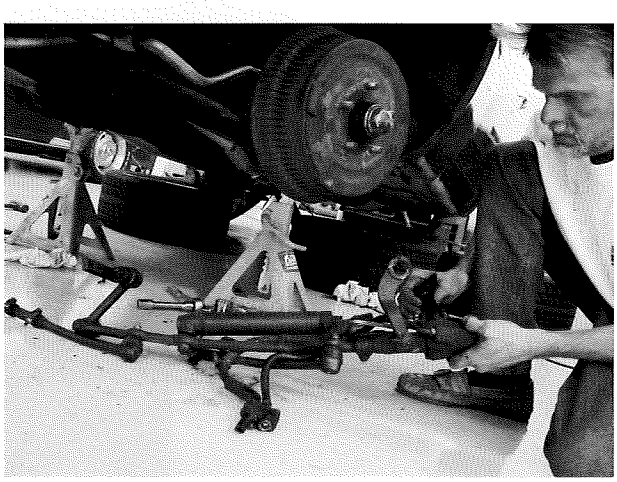


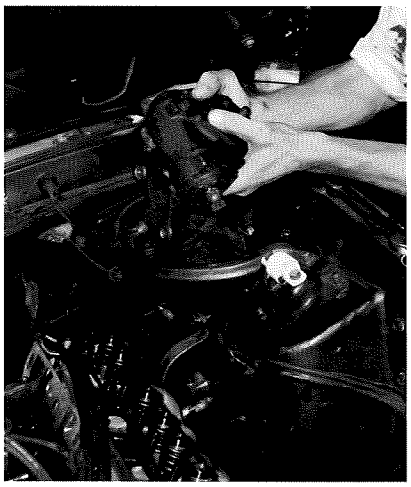
**7** *If your car has power steering, remove the pump from under the hood.*

**8** *On the passenger side, unbolt the idler arm. The bolts are accessed from inside the fender and are easier to reach with the wheel removed.*

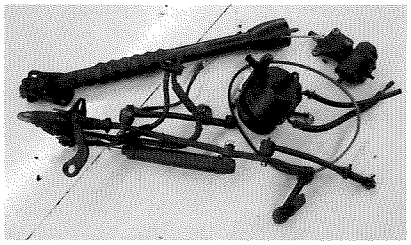
**9** *On the driver side, remove the pitman arm from the steering box using a pitman-arm puller. It can be rented from a local auto parts store.*

**10** *With the idler and pitman arms disconnected and the tie-rod ends and power-steering-pump lines removed from the pump, the whole factory steering linkage can be removed.*

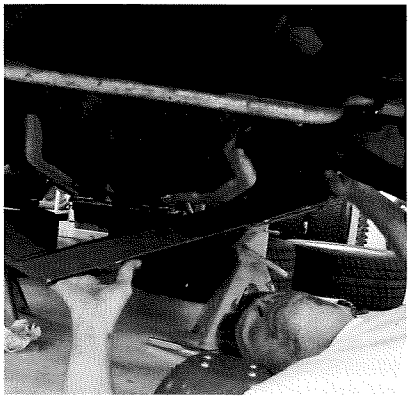




**11** *Finally, remove the steering box by removing the three bolts that hold it in place. The bolts are accessible from inside the driver-side front fender.*



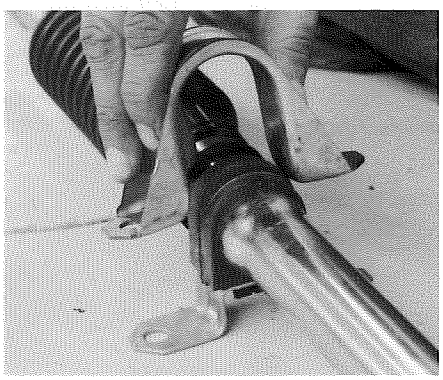
**12** *Here's the factory steering system as removed from the car: linkage, slave cylinder for the power steering, power-steering pump, steering box, and steering column. These components can be reinstalled to either sell the car without the rack-and-pinion steering or it can be installed on another car. In any case, we recommend keeping the stock steering parts.*

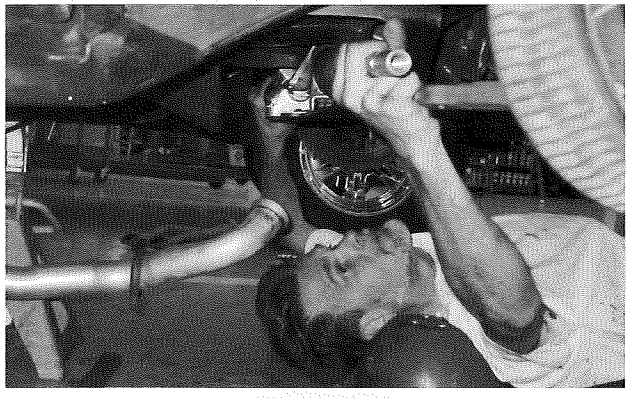


**13** *With the coast clear of all the stock steering bits, the cradle bolts right into place using the holes in the car's front subframe that originally were for the idler arm on the passenger side (two holes) and the steering box on the driver side (three holes).*

**14** *With the cradle in place, you might have to use the bolts to help align it with the holes in the subframe. Each car is different. Once the cradle is lined up, install the new bolts, washers, and nuts to secure the cradle in place. Torque the five bolts to 50-65 lb-ft.*

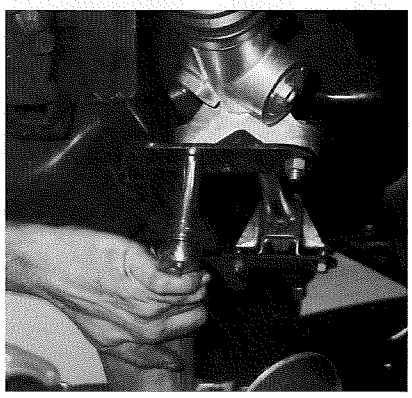
**15** *With the cradle installed, the steering rack is next. To fit the rack onto the cradle, install the passenger-side rack mounting clamp to the larger section of the rack tube (right side) using the provided hardware.*

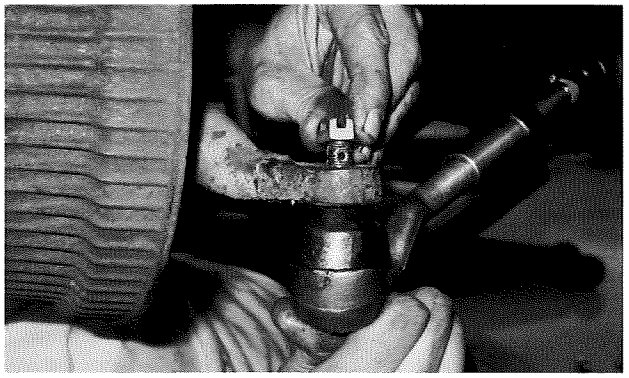




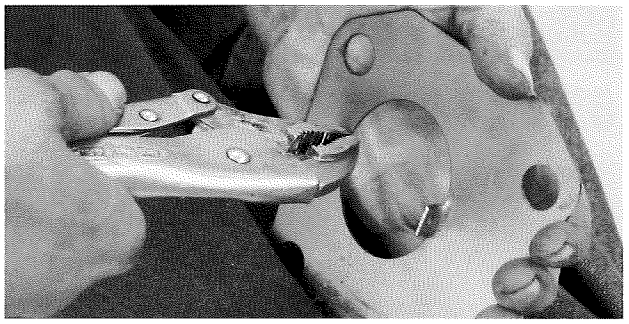
**16** *The steering rack then bolts to the cradle with the supplied hardware.*

**17** *At this point, the steering rack is installed. Installation of the tilt column is the next step after connecting the rack to the spindles via the tie-rod ends.*

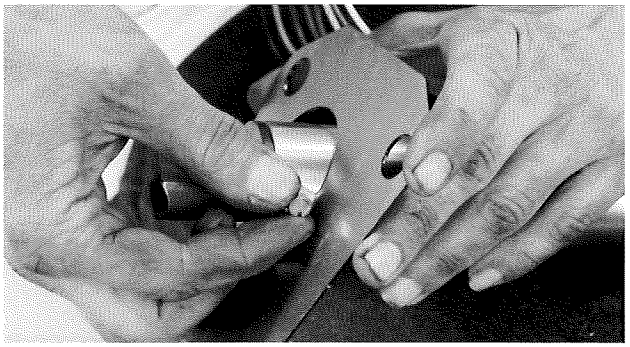




**18** *The spindles thread directly into the steering rack and reattach to the spindles as shown. Reinstall the cotter pins through the hole in the tie-rod-end threads and through the castle nuts, then bend the tabs over on the cotter pins so the nuts cannot back out.*

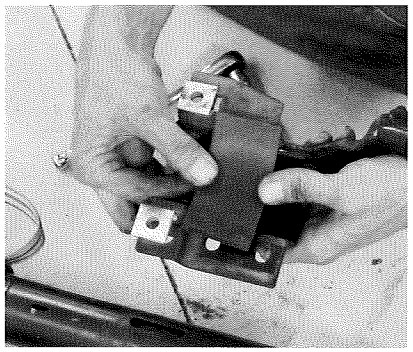


**19** *Installation of the steering column begins by bending the tabs on the floor mount inward toward the car's interior so the column can fit through it.*



**20** *With the supplied hardware, secure the floor mount to the column. Mark the location of the tabs on the column and drill a pair of small pilot holes for the screws.*

**21** *Using the dash support bracket from the original column, place the supplied rubber shim between the bracket and column to ensure a tight fit. The new column is installed using the original dash support bracket and hardware.*



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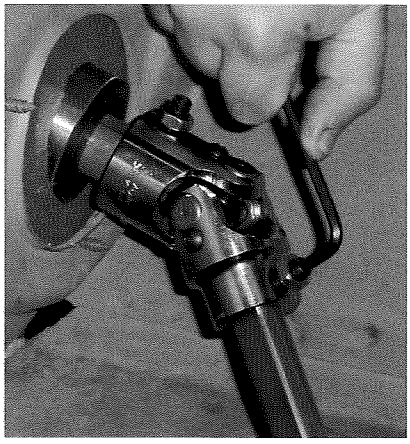
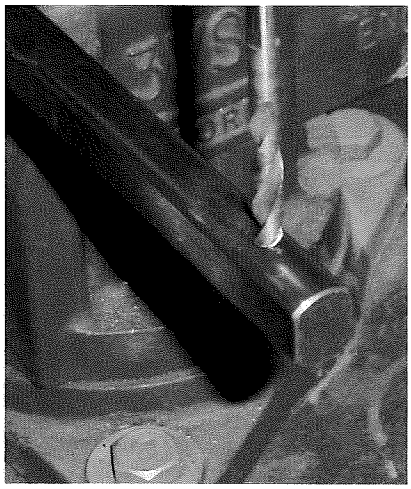
**22** *Flaming River provides the wiring information needed to interface the new column with the original wiring harness. It's up to you to match the wiring on the column with the wiring in the car. One option is to acquire another factory plug to connect the new column into the car's underdash harness. You could also cut the plug off the existing column, but do this only if you can't find another one.*

**23** *With the dash support bracket and floor mount in place, installing the new column is basically a reversal of removing the original one.*

**24** *With the column and rack installed, the next task is to measure and cut the supplied steering shaft to length. Measure from the end of the steering rack's pinion shaft (arrow) to the end of the steering column shaft, then subtract 3¼ inches from that figure, which compensates for the length of the two shaft U-joints. Be sure the shaft doesn't extend through the bottom of the U-joint yokes. For header kits, the steering shaft is cut into two pieces and three U-joints are used. There's also a support bearing for the steering-shaft section that connects to the steering column. Measurements have to be taken for each individual car before the shaft is cut.*



**25** *For installation of the U-joints, use the set screws in the U-joints to mark the steering shaft. The shaft needs to be dimpled to allow the set screws in the U-joints to be securely tightened.*



**26** *Using a ¼-inch drill bit, dimple the steering shaft where the set screws made a mark on the shaft. Reassemble the shaft and U-joints and use red Loctite to ensure the set screws don't loosen. Tighten the set screws to 25 lb-ft and tighten the jamb nuts securely.*

**SOURCE**

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