# HONDA AN & AZ 600 STEERING RACK

Bill Colford

# Introduction

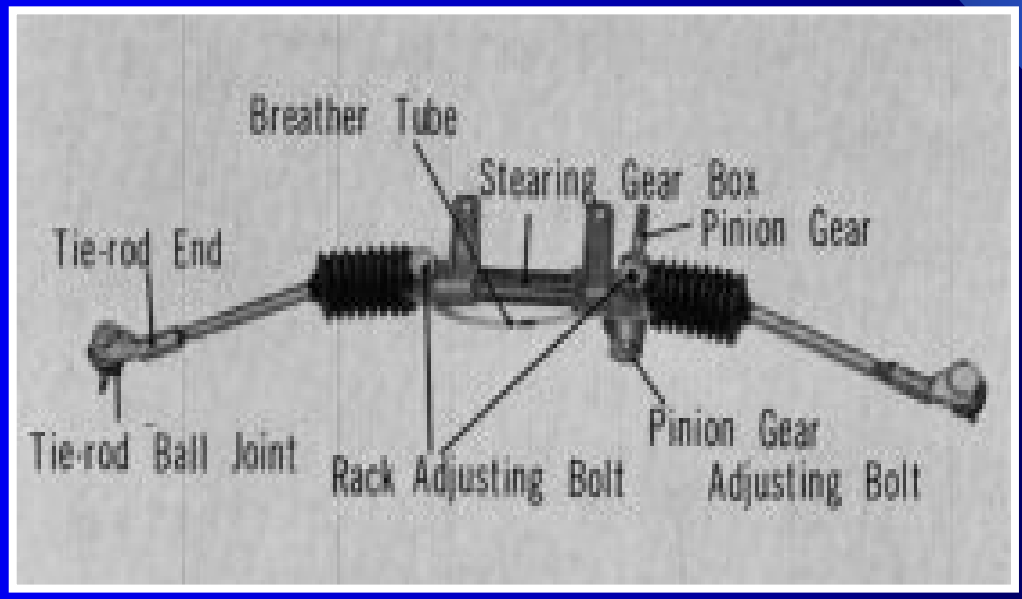
- This will be a review of how to remove, clean, inspect and reassemble the Honda 600 steering rack.
- Upon completion of this presentation you should know the differences between the Honda 600 Sedan and Coupe steering racks and which parts are interchangeable.
- Books, Tools and Equipment needed to complete this project.

# Agenda

- Removing the steering rack assembly
- Disassembly of the Rack
- Cleaning and inspection of the parts
- Reassembly of the Rack
- Installation and adjustments
- You will need a copy of the Honda 600 shop manuals Sedan and Coupe supplement.
  - These manuals will be referred to throughout the presentation to aid in maintaining the integrity of the unit and follow safety steps recommended by Honda.
- Tools you will need are metric wrenches 8mm – 17mm, 3/8 drive socket set with 8mm to 17mm 6 point sockets, various flat blade and Phillips screw drivers, a jack, jack stands and an old egg crate or box to hold bolts so they do not get mixed together.

# Overview

- This is the Honda 600 steering rack.
- It looks the same for either the Honda Sedan or Coupe and can be removed from either vehicle in the same way.




**This is a picture of the assembly from the Honda 600 manual Page 10-2.**
**A general description of the steering assembly is given in the text on that page**

# This is a drawing of the steering column to a AN600 Sedan

We will be removing the steering column from the cross bar under the dash allowing the steering column to drop which will allow the lower end of the U joint to be removed from the pinion gear shaft. ***Caution, do not remove the U joint from the steering column.***

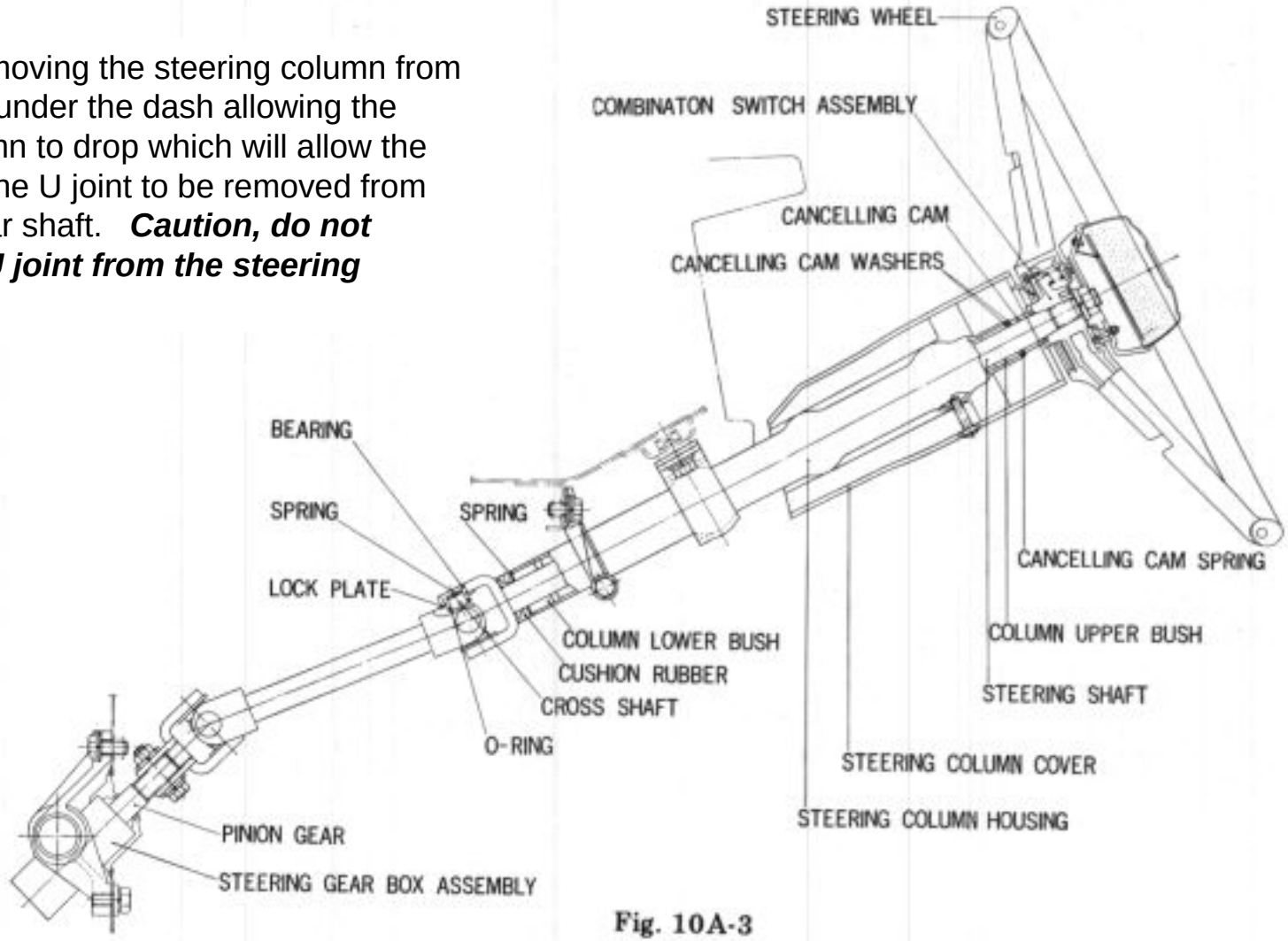



Fig. 10A-3

# Remove the two bracket bolts and two bolts holding the column clamp.

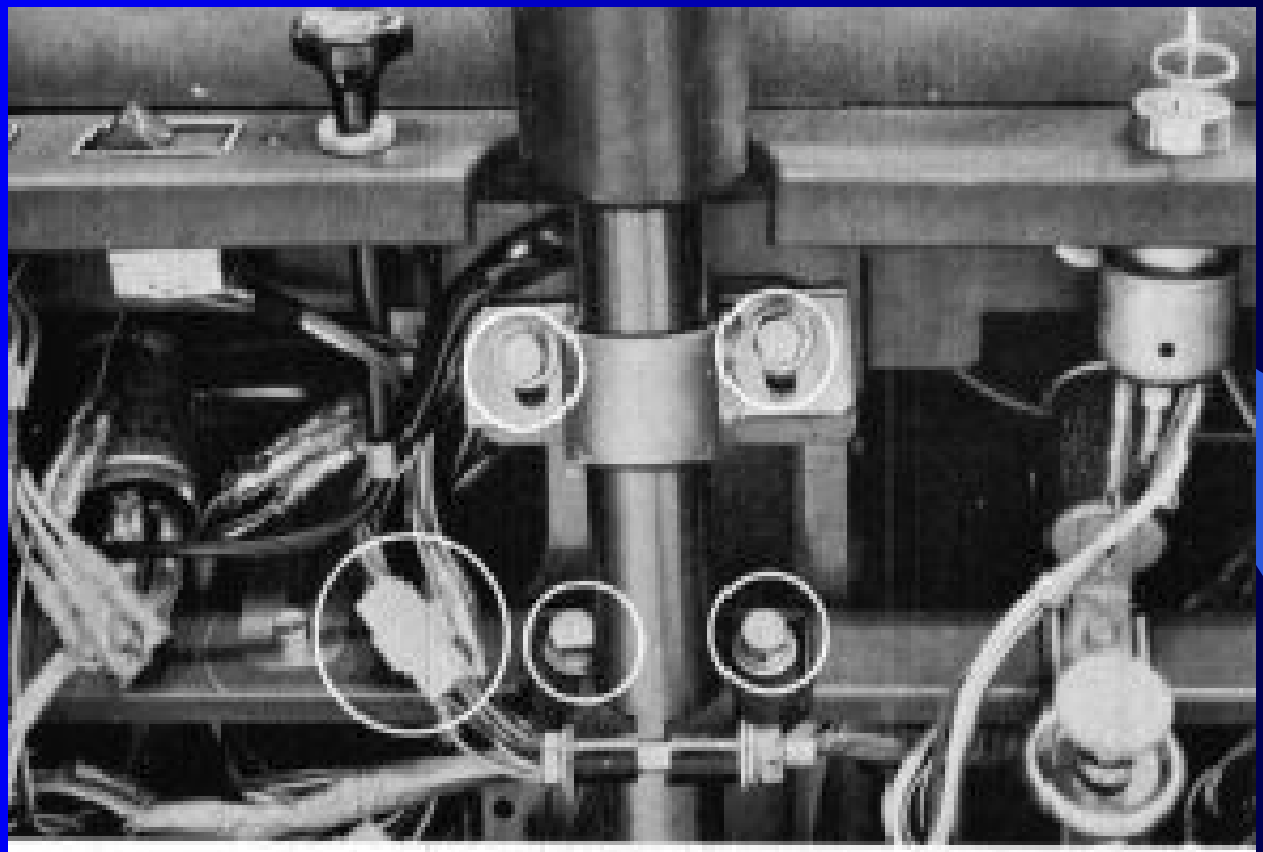


Fig. 10C-3

There are 4 bolts holding the column in place, remove the bolts and place them in the egg crate and mark for reassembly. The Shop manual says to unplug the wires, that is not necessary as we are not removing the steering column from the car

# Loosen the bolt and using a flat blade screw driver widen the clamp to allow it to be removed from the pinion shaft.

Here you will have to remove some of the carpeting or just pull it away from the steering column to allow access to the pinion shaft. (go to page 10-10 for another view of the assembly) You are probably thinking “shouldn’t I be marking things to get them back together the same way?” It’s not necessary to mark shafts or steering U Joint as the whole unit is being removed. But, you should write down how the clamp is placed on the pinion shaft. With the wheels straight, write down or draw a picture of how the clamp is located on the pinion shaft. Something like it is located at 6 o’clock on the reference.

Once you have the steering column U joint off the pinion shaft lay them to the side.

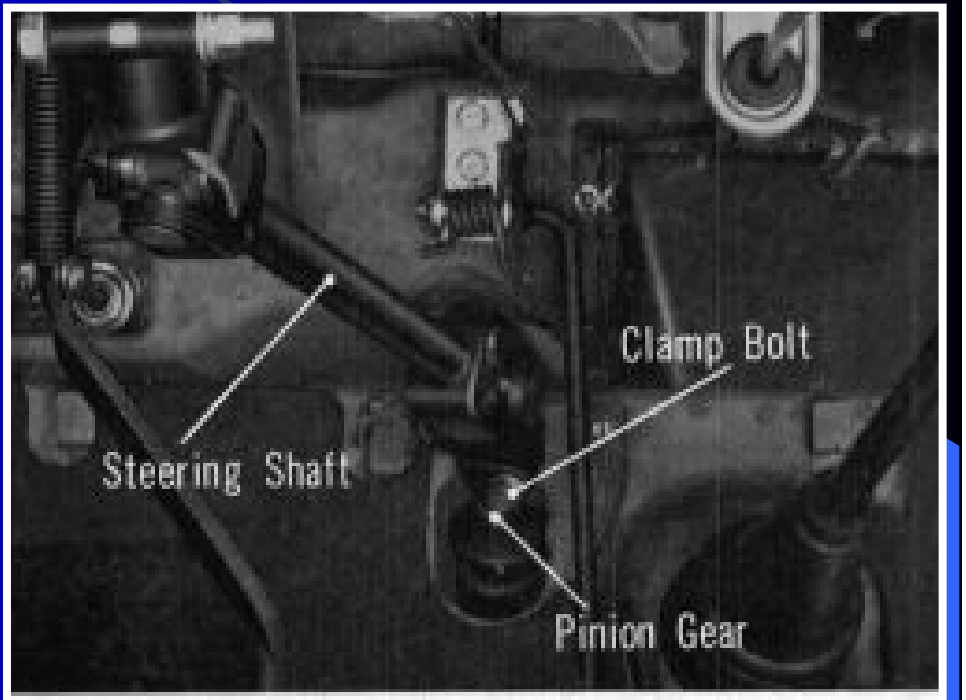



Fig. 10C-2

# On the inside of the Engine Compartment

- **There are two bolts holding the Rack assembly in place (Fig 10D-4) and another two bolts on the inside of the car (Fig 10D-5) remove them all and place in your egg crate marking it to assist in reassembly.**
  - **Now is the time to think about jacking the front end of the car off the ground and getting some jack stands under the car.**

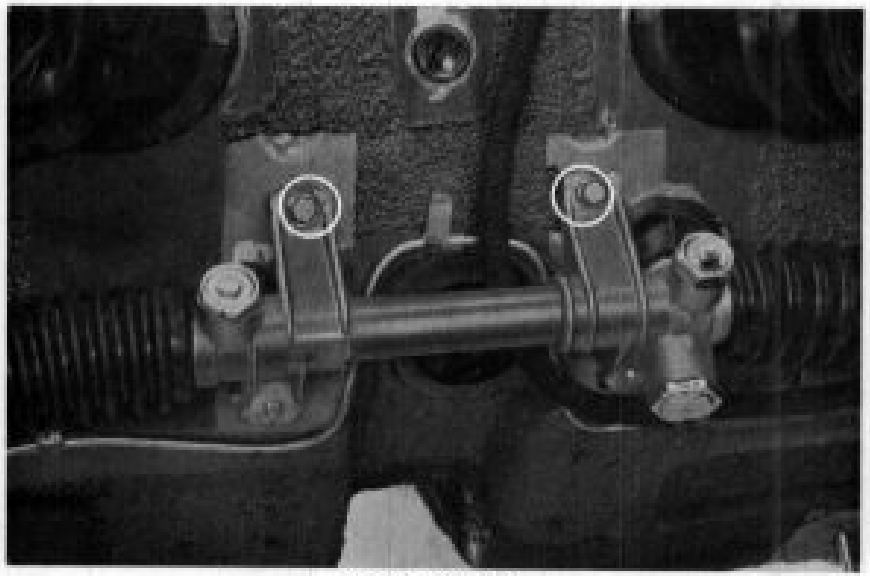


Fig. 10D-4

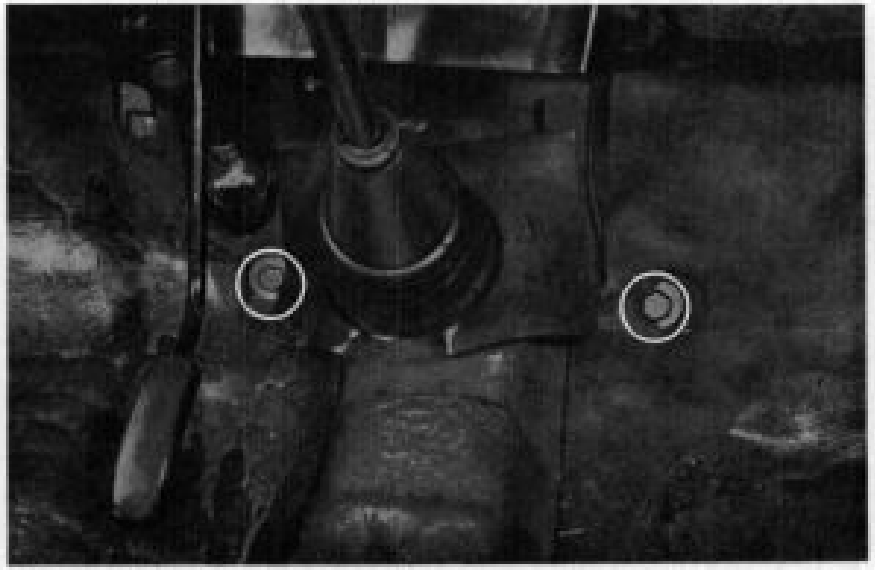


Fig. 10D-5

# Removing the tie rod ends

- This is a either/or situation.  I remove the tie rod end from the shaft and count the number of turns made when removing them for reassembly.
- Removing the tie rod end from the strut is a chore and some times it can cause damage to the dust cover on the tie rod end or even damage the tie rod itself.  But, backing off the nut at the end of the tie rod end and turning the shaft is a easy alternative.  Both will leave your rack assembly free to be removed.  See (Fig E-2) to see how to remove the tie rod end from the shaft.

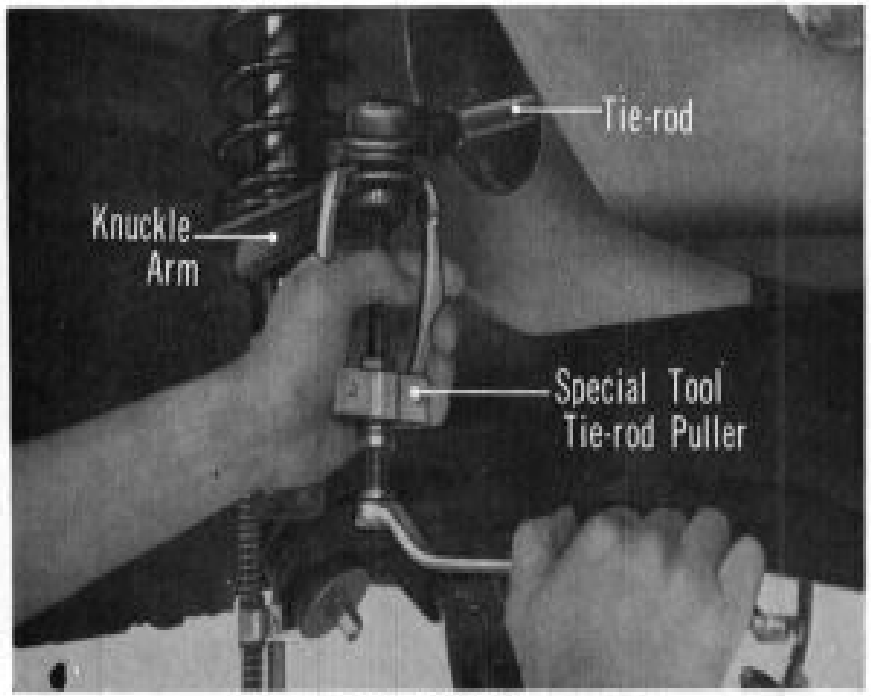


Fig. 10D-2

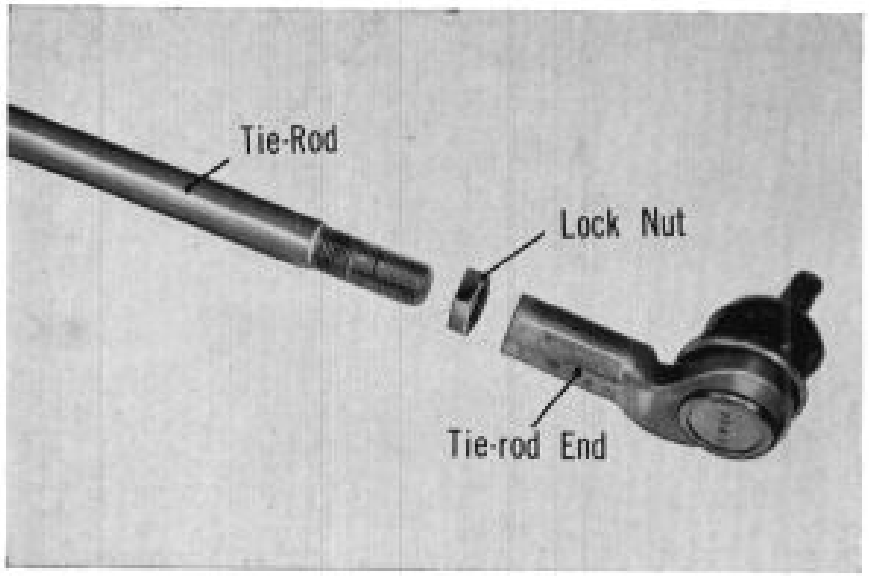


Fig. 10D-10

# Removing the tie rod end shaft and removing the assembly.

1. Here is where the Honda shop manual gets kind of fuzzy.
2. Once the two tie rod ends are removed or unbolted from the strut, the assembly should be loose. It will take some work, and you may even have to tilt the engine forward depending on the amount of room available. Vehicles that kissed the car in front of it some time in the past may have issues.
3. Remove the rack from the left or drivers side. It will have to be turned and dropped down to get it out of the fire wall of the engine compartment but it will come out.

Fig. 10E-2

# Pinion shaft disassembly

- Follow this by Fig 8, 9, 22 and 12b.
- Honda kind of confused this area between trying to adjust and disassemble the unit there are some switching around in the shop manual. So lets start with Fig. 10D-8, remove the lock nut at the end and then remove the mounting bolt, pull out the “U” thrust plate and remove the shaft.

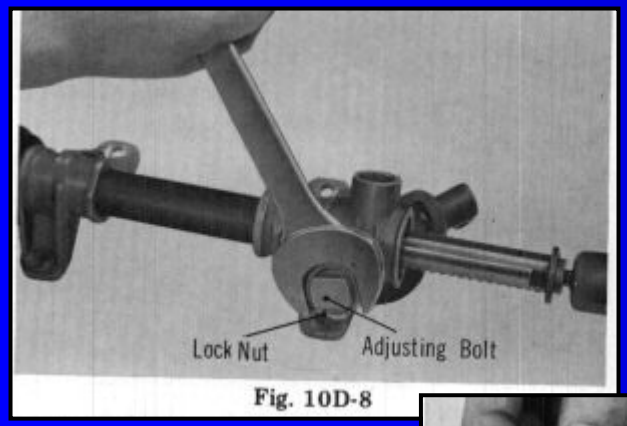


Fig. 10D-8

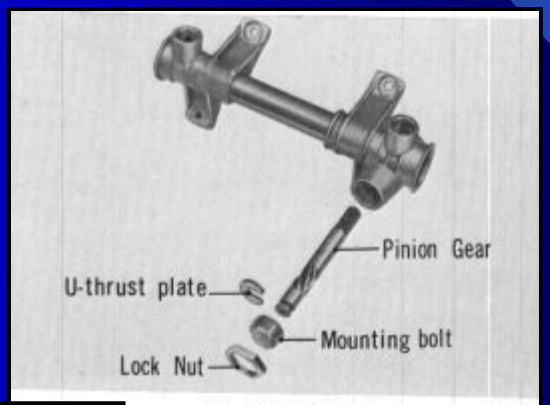


Fig. 10D-22

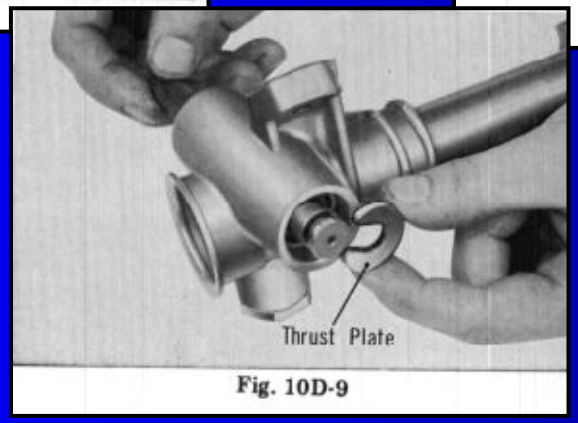


Fig. 10D-9

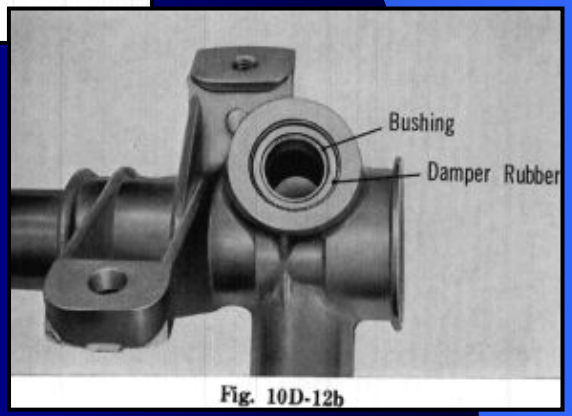


Fig. 10D-12b

**This is a picture of the steering rack pinion shaft assembly.**

**Missing from the description list are the spacers that are under the bushings #20 and there are two of them.**

**One under the upper bushing and one under the lower bushing.**

**I have added arrows and wording to the drawing to identify the two spacers. The two bushings shown in the picture is a bit misleading. The upper spacer is supposed to be under the upper bushing and the same with the lower spacer, would be under the lower bushing #20.**

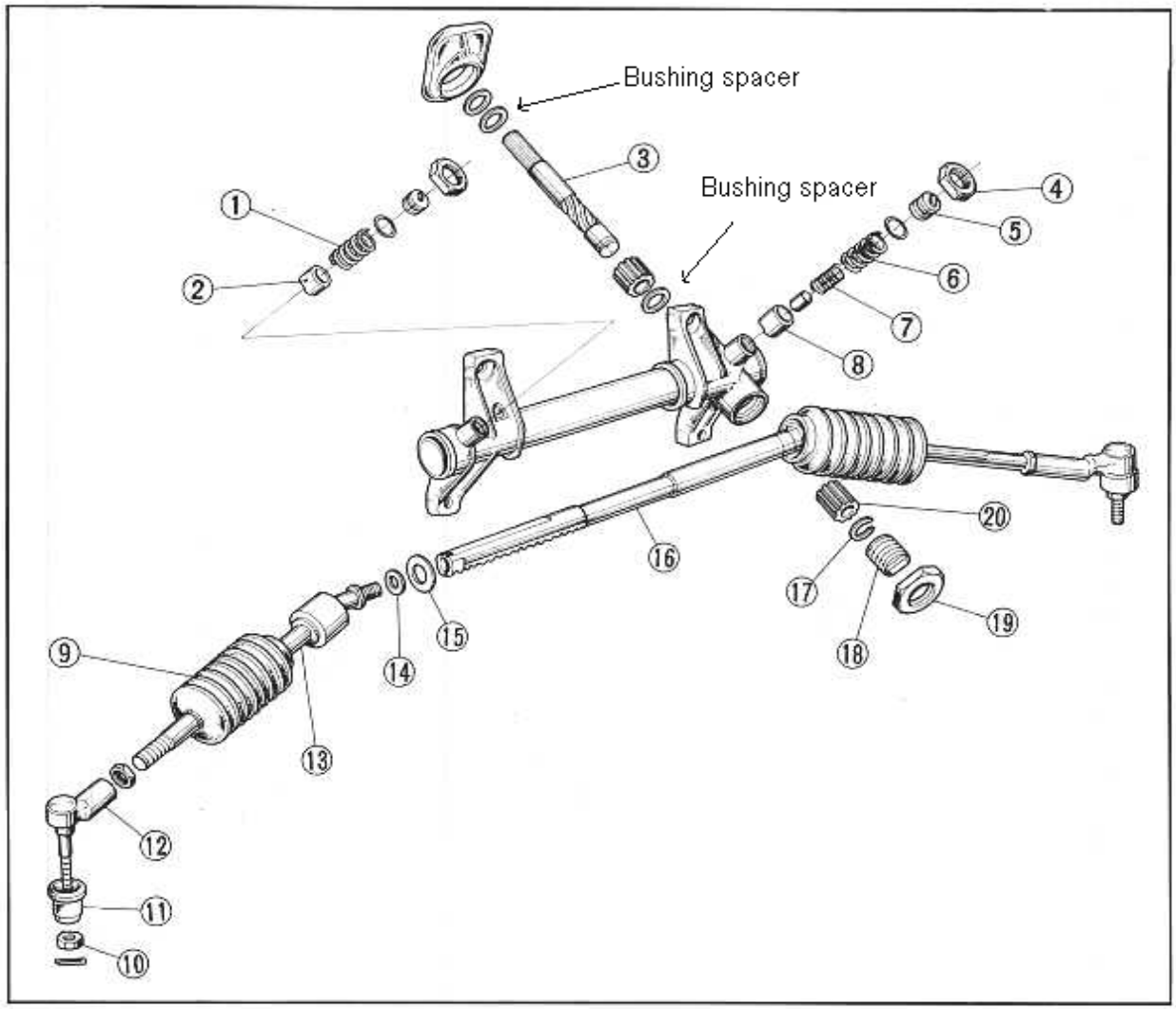
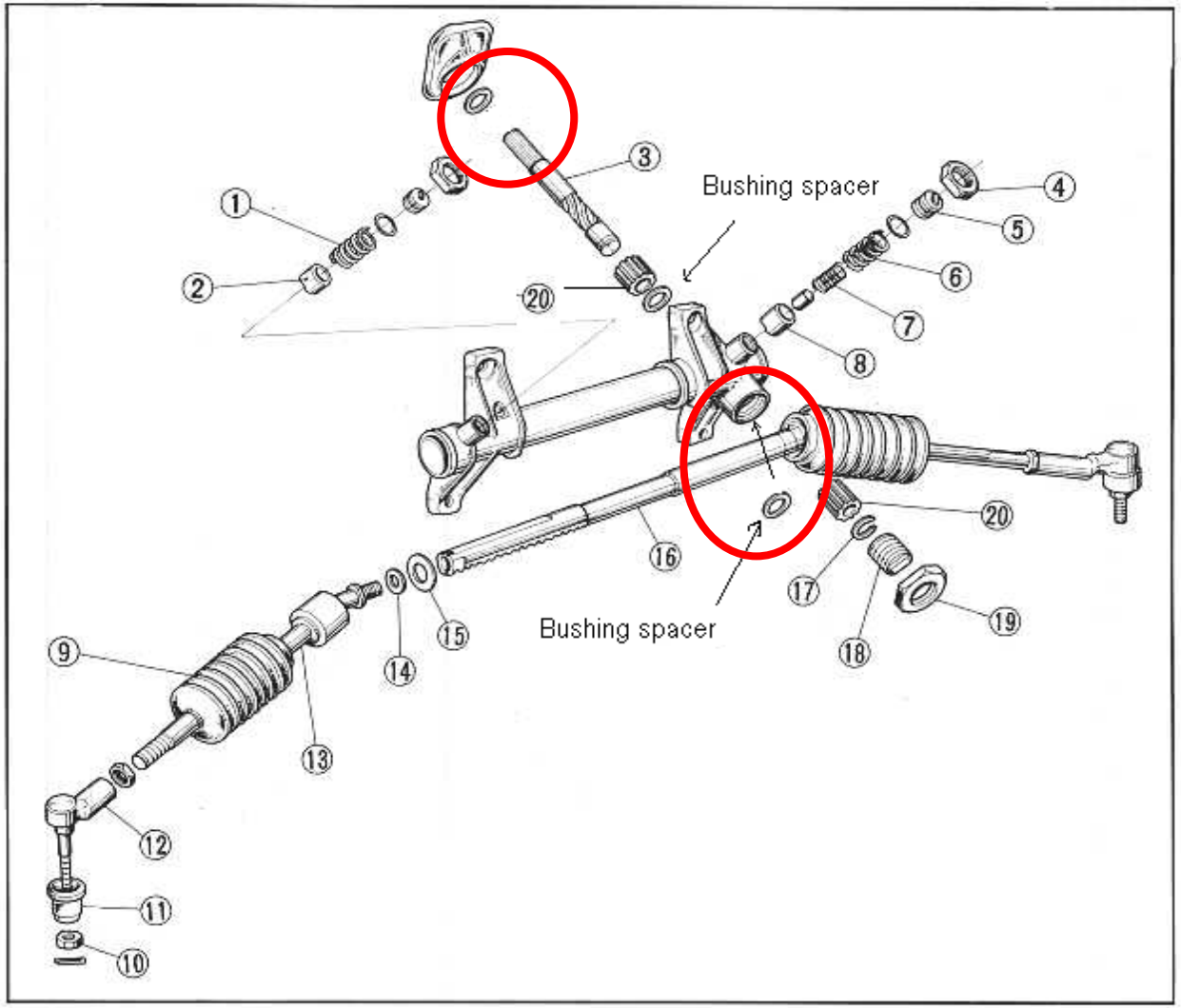



Fig. 10-8
① Rack Guide Inner Spring B
② Rack Guide B
③ Steering Pinion
④ Rack Adjusting Nut
⑤ Rack Adjusting Bolt
⑥ Rack Guide Outer Spring
⑦ Rack Guide Inner Spring
⑧ Rack Guide A
⑨ Tie-Rod Bellows
⑩ 4.0–4.5 kg-m (28.9–32.5 lbs-ft)
⑪ Tie-Rod End Boot
⑫ Tie-Rod End Assembly
⑬ Steering Rack End Assembly
⑭ Tie-Rod Lock Washer
⑮ Tie-Rod Thrust Plate
⑯ Steering Rack
⑰ Pinion Thrust Washer
⑱ Pinion Washer Bolt
⑲ Pinion Washer Nut
⑳ Pinion Bushing

This is a modified version of the factory drawing on the previous slide. Note that item #20 is identified on both bushings and the spacer is also removed from its previous position at the top of the pinion shaft to under the lower bushing.

This is important because if the spacers are not located in the right position there can be binding. Also note that the upper and lower spacers are different sizes, keep them with the end of the shaft housing they came from. They will be warn in the center, that is ok, the renewed bushing you are putting back into the rack will be more than enough to take up all the slack.

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⑮ Tie-Rod Thrust Plate
⑯ Steering Rack
⑰ Pinion Thrust Washer
⑱ Pinion Washer Bolt
⑲ Pinion Washer Nut
⑳ Pinion Bushing

This is a picture of the pinion shaft and the two spacers. Note that they are a bit over sized in the center and laid out to associate them with the bushing and end of the pinion shaft they go to.

Use a chisel to push back the lock washer tabs at the end of the tie-rod end assembly. Don't damage it as if removed carefully it can be use again.

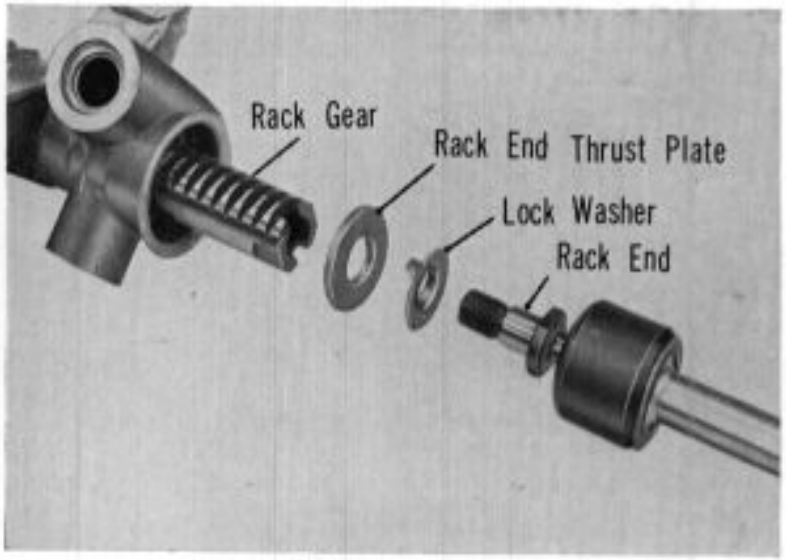


Fig. 10D-25

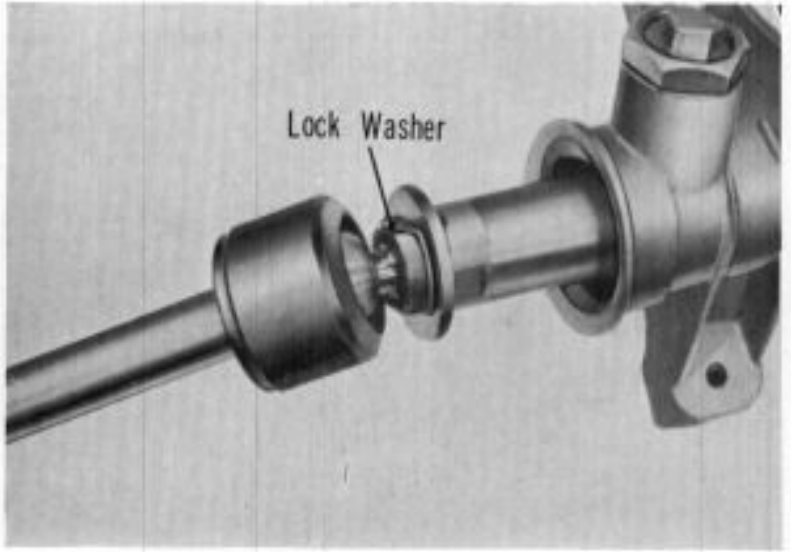


Fig. 10D-26

**To the right is a picture of the lock washer and thrust plate – note the lock washer was removed and is still serviceable.**

# Before going further, make sure you have the correct replacement parts if your going to use them. Normally these are the rack end assemblies. Note that the Sedan is longer than the Coupe.

- Pull back the boot and measure them. If they are the same length your good to go. But this is the only part of the Rack that is different between the Sedan and Coupe. All other parts are interchangeable.
- Yes, the Shop Manual says that if the arm does not stay straight when you hold it horizontal it is warn and should be replaced. Well, I have purchased new ones and none of them could stay straight out when performing that test. So, don't throw out the used ones just yet. Check for play, pull on the inner shaft to see if it will move in and out. Most are still good.

These are the Rack end assemblies, the longer of the two is for the AN600 part number 53521-568-020 and the shorter is to the AZ600 part number 53521-605-000. After removal and disassembled, note if the joint is loose, worn or will not stay straight out when released.

# REMOVE THE END ASSEMBLIES FROM THE SHAFT.

- Keep all the parts organized so reassembly is truly a reverse procedure. Clean everything and inspect for wear. Chips, scrapes, wear and damage.

1. Use a flat blade chisel to bend back the locking tab. Be easy on it as you will have to reuse it. None are available from Honda.
2. The end assemblies were gold cad or gold zinc plated when new from the factory as were the bolts and washers. Use soap and water on the boots and the rubber grommet on the pinion shaft.

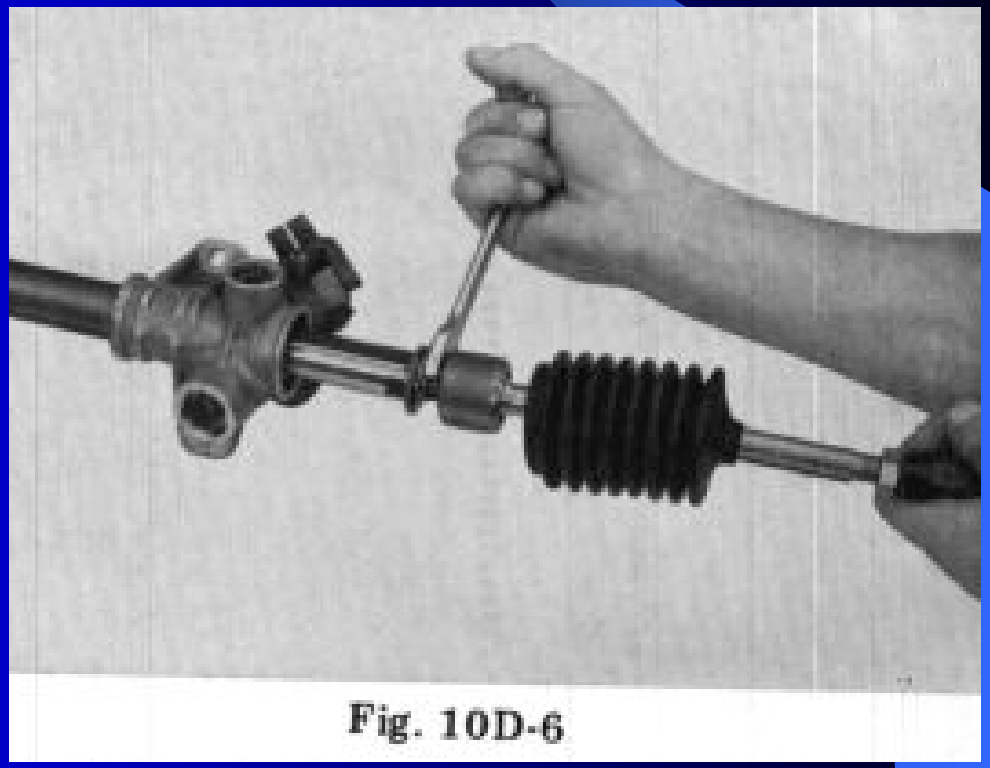

Fig. 10D-6

# Remove the adjusting bolts and inner workings before removing the Rack Gear… (part 1)

Clean everything in a solvent like mineral spirits or if you need a spray product use brake cleaner. Carb cleaner is very harsh on rubber and nylon parts. Wash the rubber parts in soap and water after cleaning all the grease out of them you can. Then spray with a rubber protecting product like Mothers Protectant.

Clean and polish the aluminum and paint the center Black.

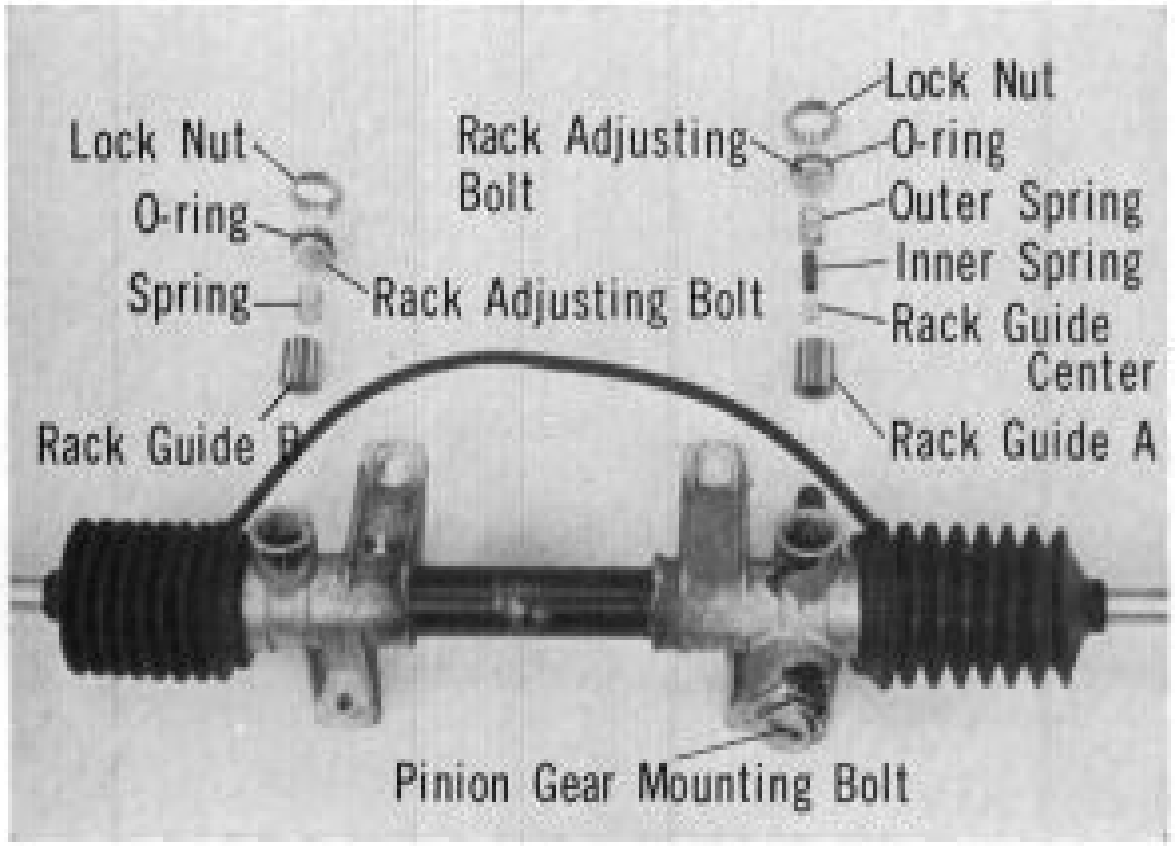


Fig. 10D-27

# Remove the adjusting bolts and inner workings before removing the Rack Gear… (part 2)

Watch how the rack guides go in, they are put in to lift or push down on the rack gear. The rack guide center is a small nylon busing that rests in the center of the Rack Guide. All of this has to be removed and cleaned then greased and reassembled.

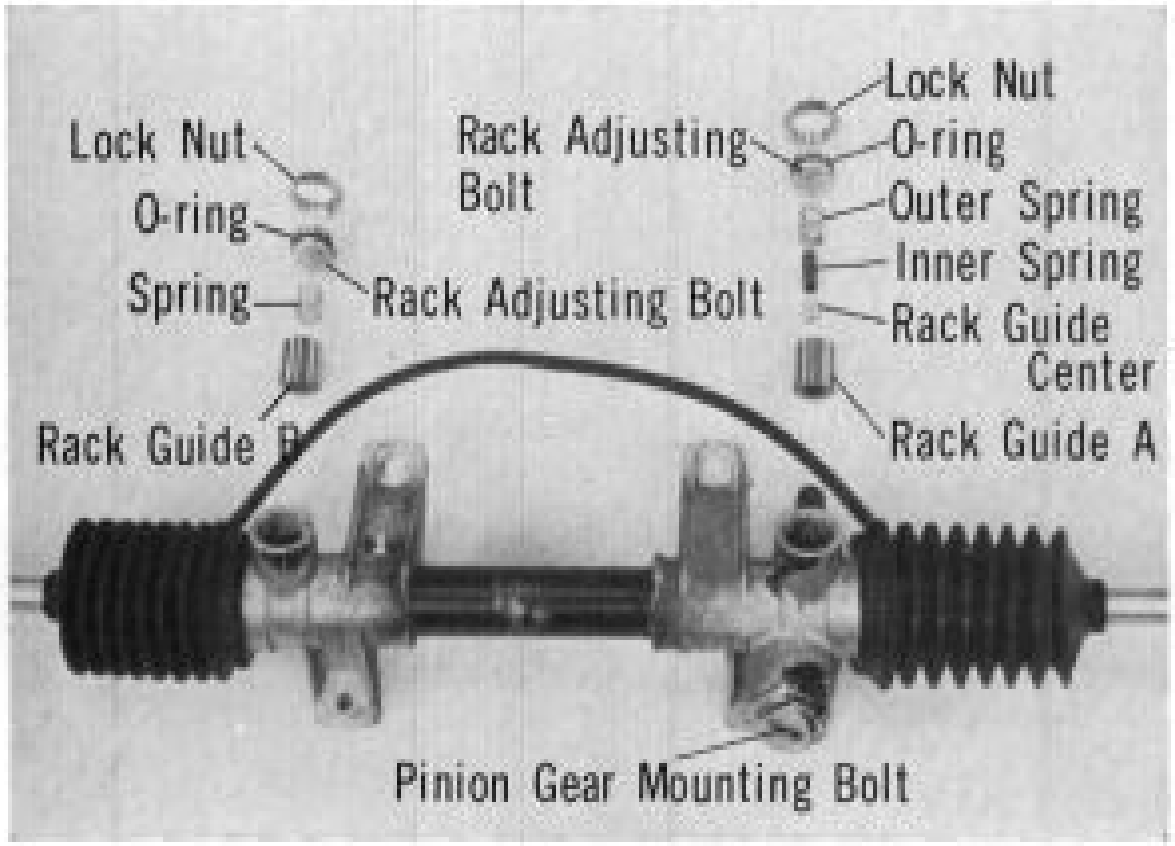


Fig. 10D-27

When reassembling the rack, make sure everything is sparkling clean, wire brush with a stainless steel wire brush or other nonferrous metal wire brush. Scrub the interior with a  scotch bright pad to remove 30 + years of old grease.

# Old bushings vs. new reproductions

- Lyle Trudell put these rubber dampers (left) together, you can also wrap thick rubber tape or plastic tape to fill the gap.
- The two ugly bushings to the right are fresh out of the rack.
  1. The pinion shaft bushings are the reason most rack and pinion units are removed. The damper rubber was originally vulcanized to the metal bushing, and grease inside the rack liquefied the rubber leaving the mess shown to the right of the screen.
  2. Clean off all the old rubber, the bushings didn't wear as the rubber took up all the slack. And, the spacer washers on the bottom of each bushing held the shaft.
  3. Wrap them with a thin rubber hose or tube as Lyle show's to the left of the screen. The object is to get the slack out.
  4. Then reassemble.

Reassemble the pinion spacers and bushings install the pinion shaft and make everything finger tight.

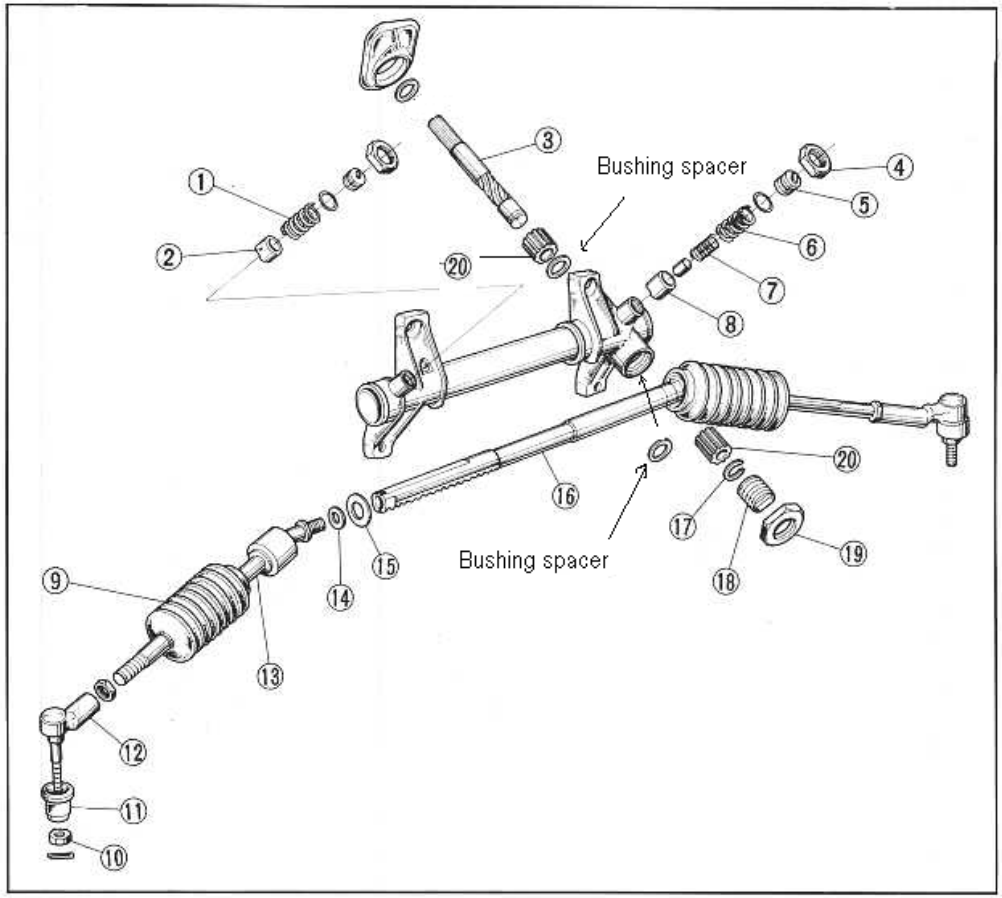


Fig. 10-8
① Rack Guide Inner Spring B
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⑳ Pinion Bushing

# Look at the previous screen and keep things finger tight until the rack gear is in place.

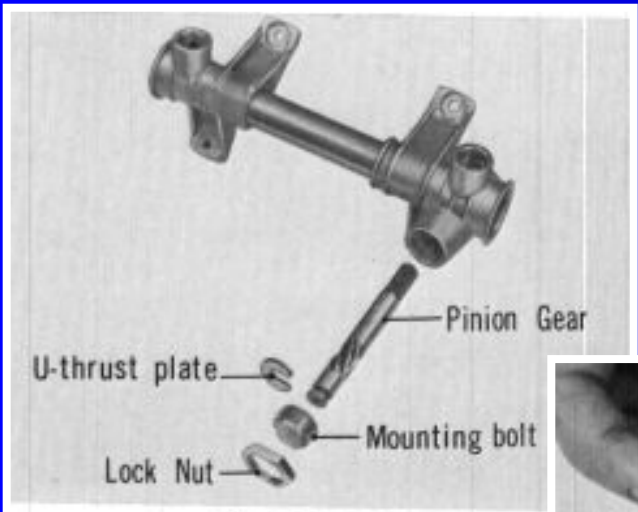

Fig. 10D-22

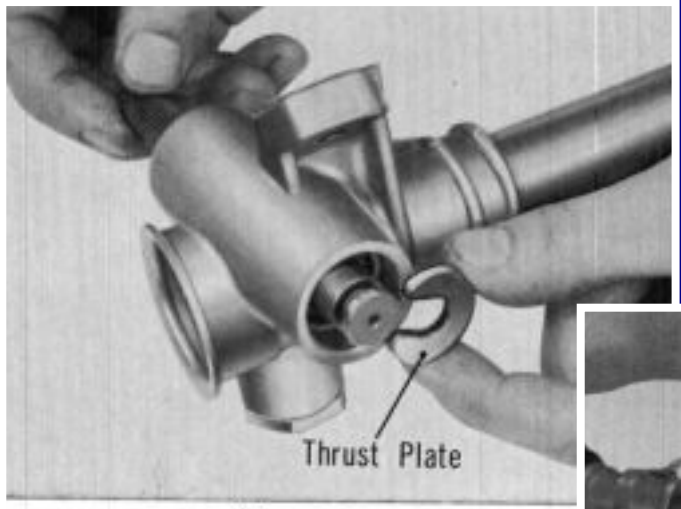

Fig. 10D-9

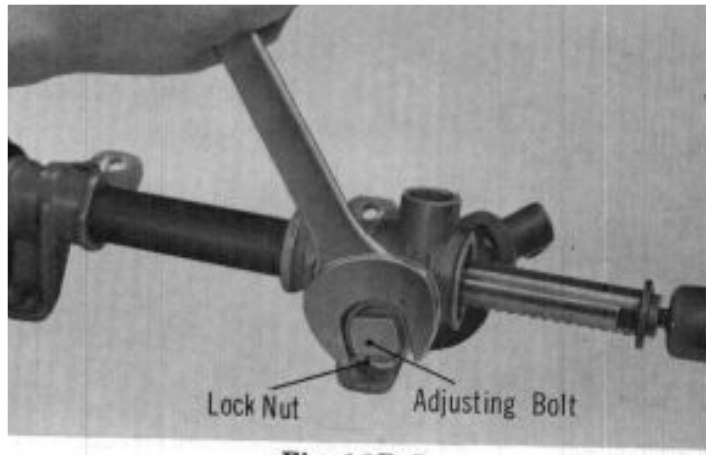

Fig. 10D-8

# Reinstall the rack gear

- Grease the rack gear
- Attach the rack ends ensuring the thrust plate and lock washer are in place then using a flat punch reset the locking tabs.

Fig. 10D-7

| | |
|---|---|
| Tie-rod ball joint (to knuckle arm) | 4.0-4.5kg-m (28.9-32.5lbs-ft) |

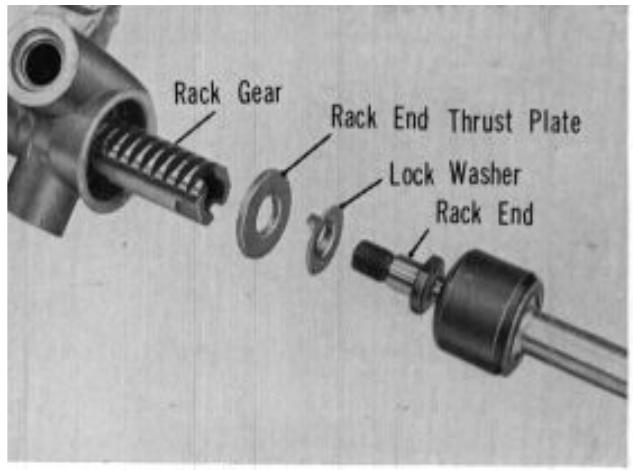

Fig. 10D-25

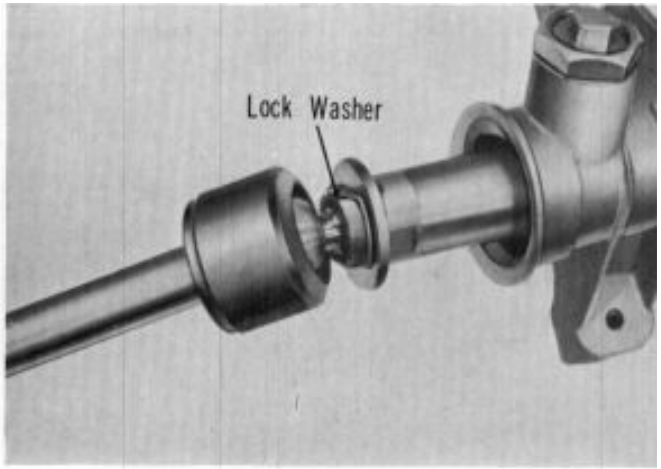

Fig. 10D-26

# Reassemble the Adjusting bolt,

- Grease and install all the parts in reverse order of what you removed.
- Do not tighten the adjusting bolt or the lock ring, for now keep them finger tight, with the exception of the end assemblies and they should be to Torque spec.

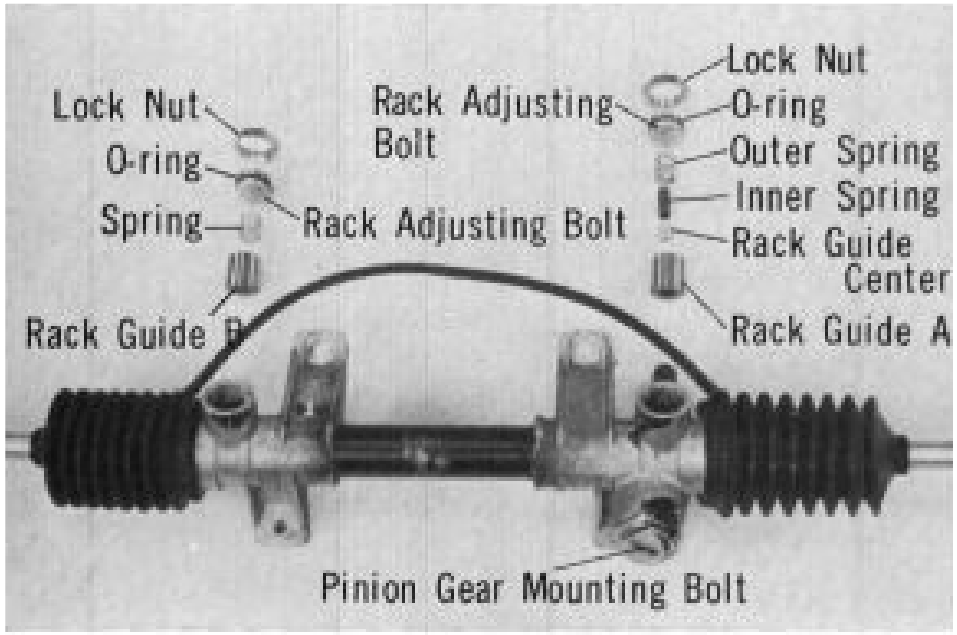


Fig. 10D-27

## Rack guide adjustments

If excessive movement is found at the rack by turning the rack adjusting bolt (2) – place the rack gear in the center of the assembly and adjust the bolt fully to lock the rack, and back it off 15-25 degrees. Hold the adjusting bolt and tighten the lock nut. If the adjusting bolt moves the adjustment will be wrong.

Do this to both left and right rack guides.

See more on car adjustments in the Honda 600 Coupe supplement manual page 15.

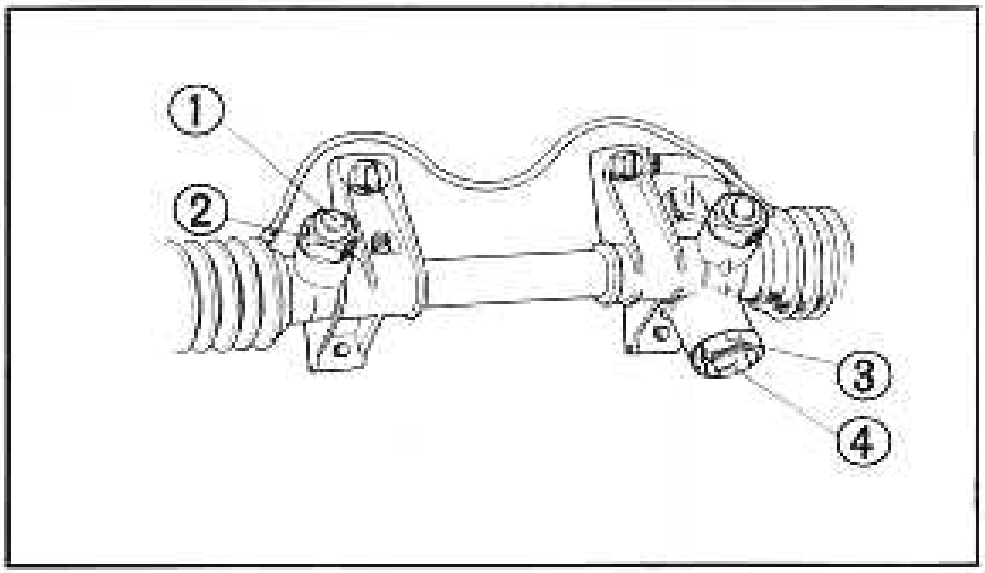


Fig. 2-8
① Rack Adjusting Nut
② Rack Adjusting Bolt
③ Pinion Washer Nut
④ Pinion Washer Bolt

| Specified torque | |
|---|---|
| Steering rack adjusting nut | 2.0-2.5 kg-m (14.5-18.0 lb/ft) |
| Pinion washer nut | 2.0-2.5 kg-m (14.5-18.0 lb/ft) |

# With your rack all back together

- reinstall the rack – make sure the front wheels are straight when reconnecting the tie-rod ends and steering U joint at the bottom of the steering column. Look back to screens 9 (for the tie-rods and 7 for the U joint) and thread the tie-rod end assembly into the tie-rods and put the clamp on the pinion shaft as it would be in reference to the drawing or reference made when removing it.
  This will help to keep the steering wheel lined up with the direction of the wheels.
  - The Toe-in bar shown in Fig E-1 is something most restores don't have. Using a measuring tape, mark the front tires with chalk and rolling the car back and forth adjusting the tie-rod ends to make them equal and aligning them. Once the wheels are aligned, fit the U joint assembly onto the pinion shaft and all will be good.

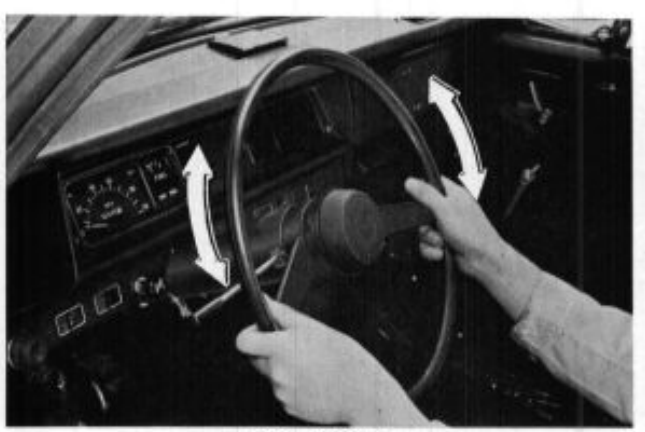

Fig. 10D-11

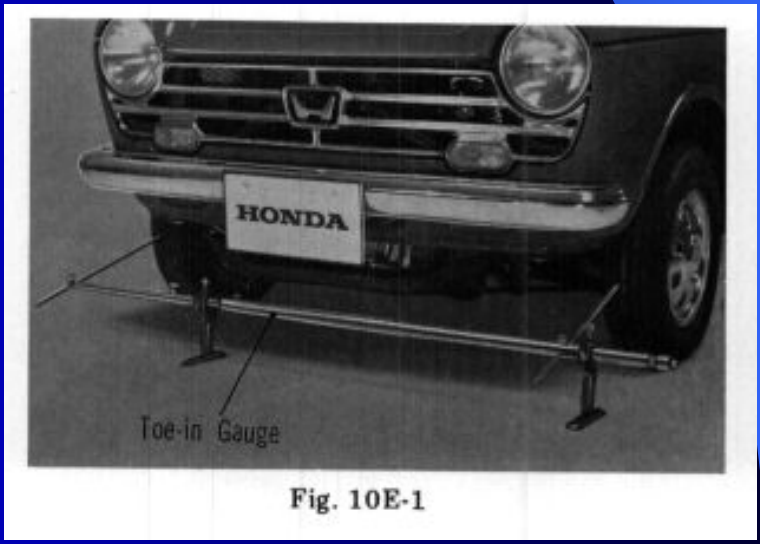


Fig. 10E-1

Now is the time to tighten every thing up. The tie-rod ball joint assembly should be tight already, but specifications are as

Torque Specifications

| | |
|---|---|
| Rack end ball joint | 5.5–6.0kg-m (39.8–43.4lbs-ft) |
| Gear box retaining bolts | 2.0–2.4kg-m (14.5–17.4lbs-ft) |
| Tie-rod end lock nut | 4.0–4.5kg-m (28.9–32.5lbs-ft) |
| Tie-rod ball joint (to knuckle arm) | 4.0–4.5kg-m (28.9–32.5lbs-ft) |


Your Honda 600 steering rack should be ready for the road.