CHAPTER

13

Coupling Systems

Instructor Name: (Your Name)

Objectives

Upon completion and review of this chapter, the student should be able to:

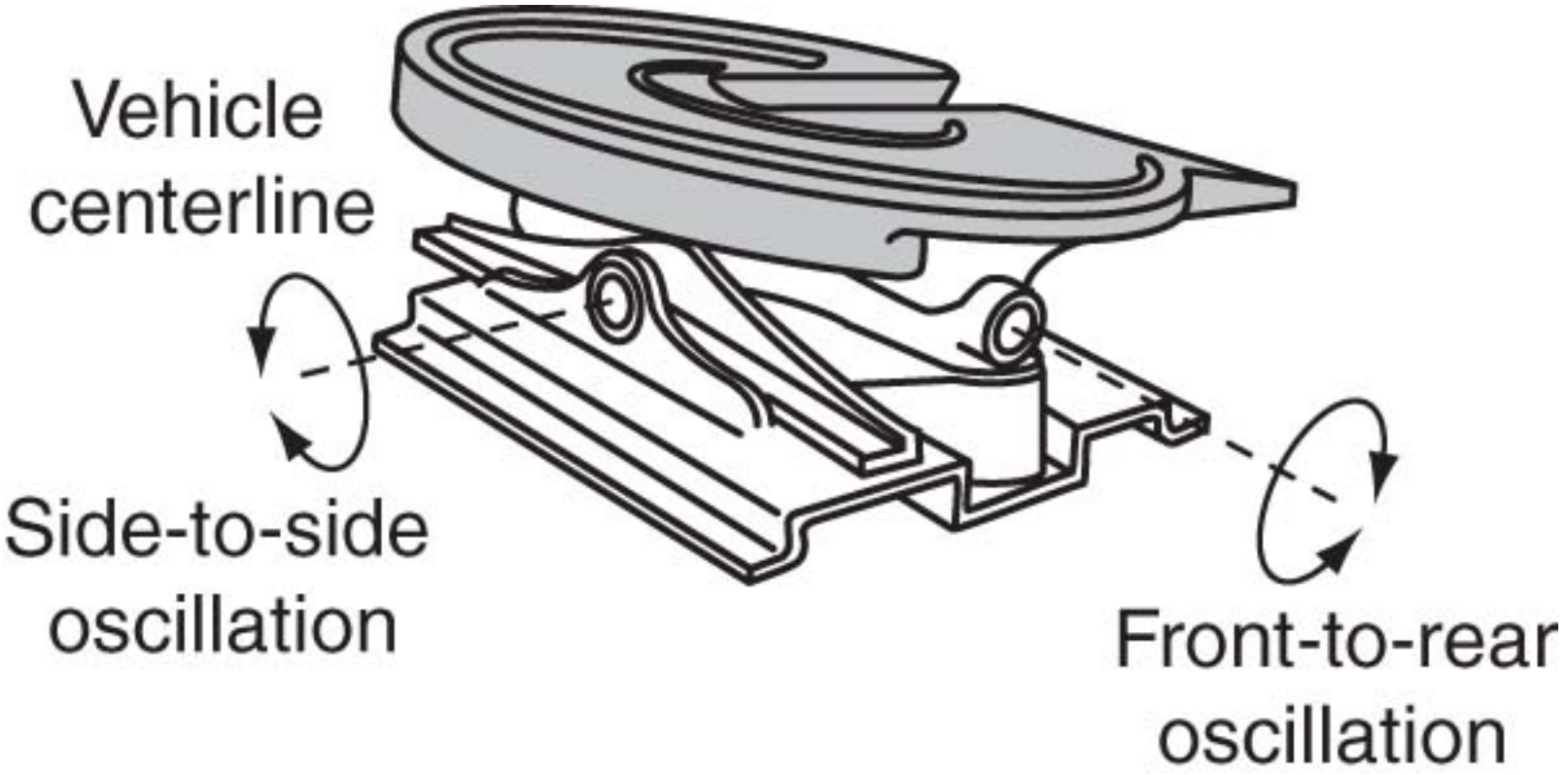
- Describe some of the different styles and types of fifth wheels available in the trucking industry.
- Outline the operation of the Holland, Fontaine, and ConMet fifth wheels.
- Explain the importance and list the consequences of incorrectly locating the fifth wheel on the tractor.
- Describe the locking principles of each type of fifth wheel.
- Explain how to couple and uncouple a tractor trailer.
- Perform general service procedures to common fifth wheels.

Objectives Continued

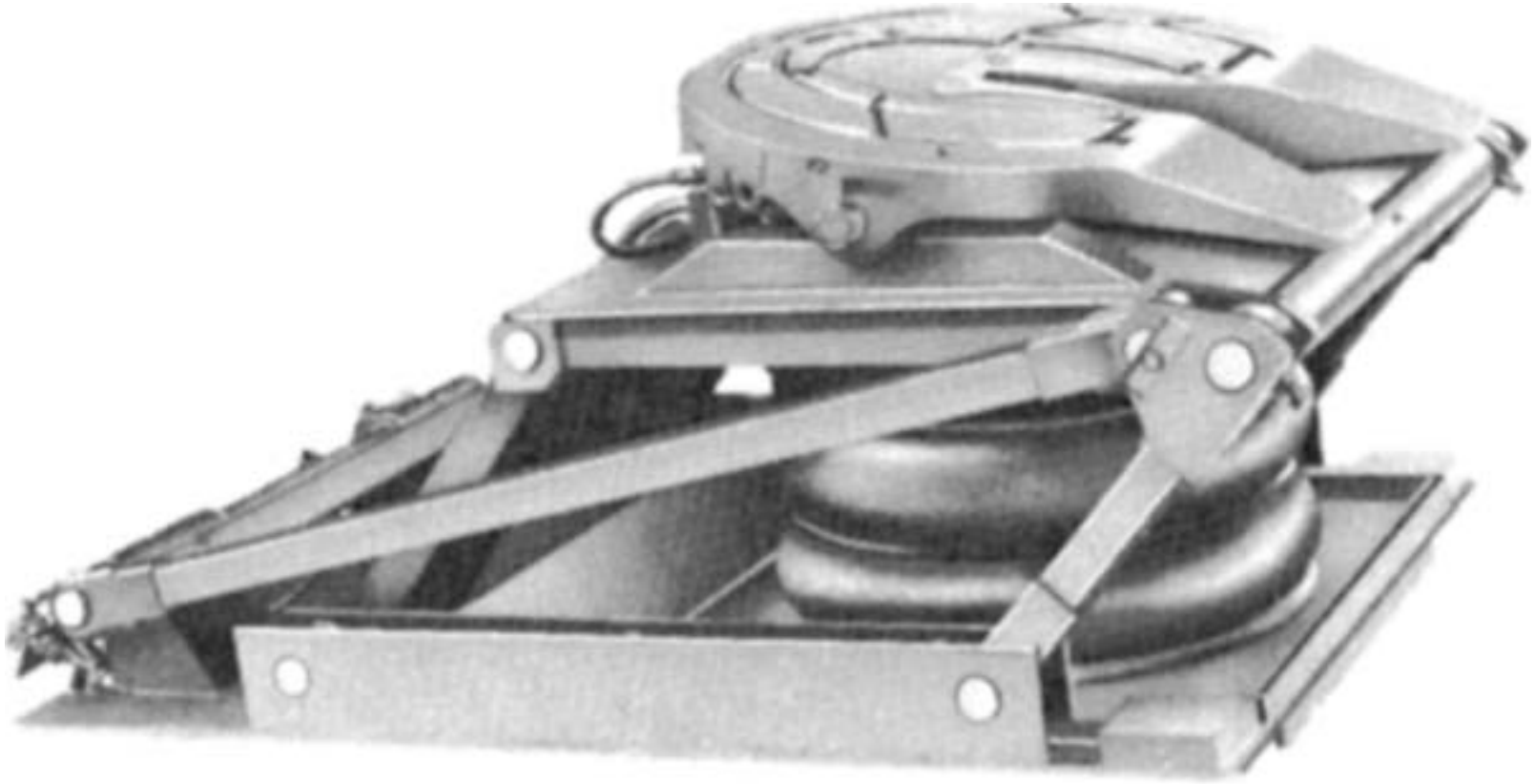
- Describe the procedure required to overhaul a fifth wheel.
- Explain the term high hitch and how it can be avoided.
- Describe the operating principle of pintle hooks/couplers and draw bars.
- Describe the benefits of cushioning to a coupling system.
- Outline prescribed maintenance for pintle hooks/couplers and drawbars.
- Outline the function of the kingpin and upper coupler assembly.

Fifth Wheel Assembly

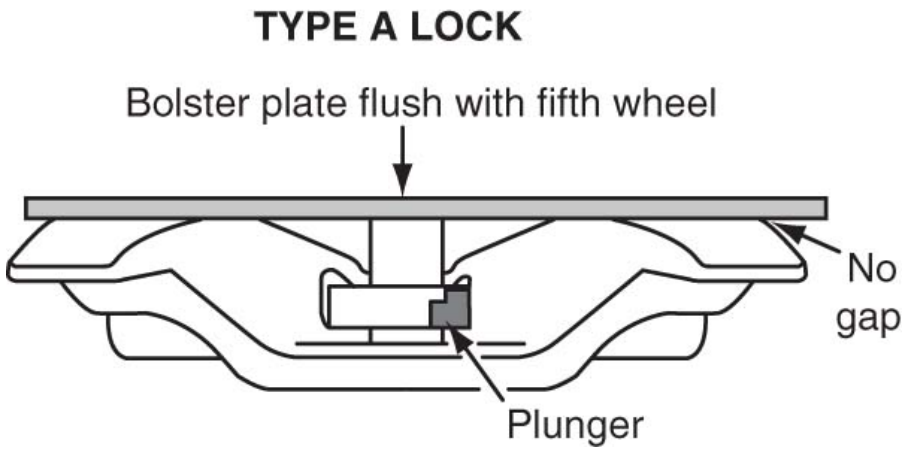
Oscillating Fifth Wheel



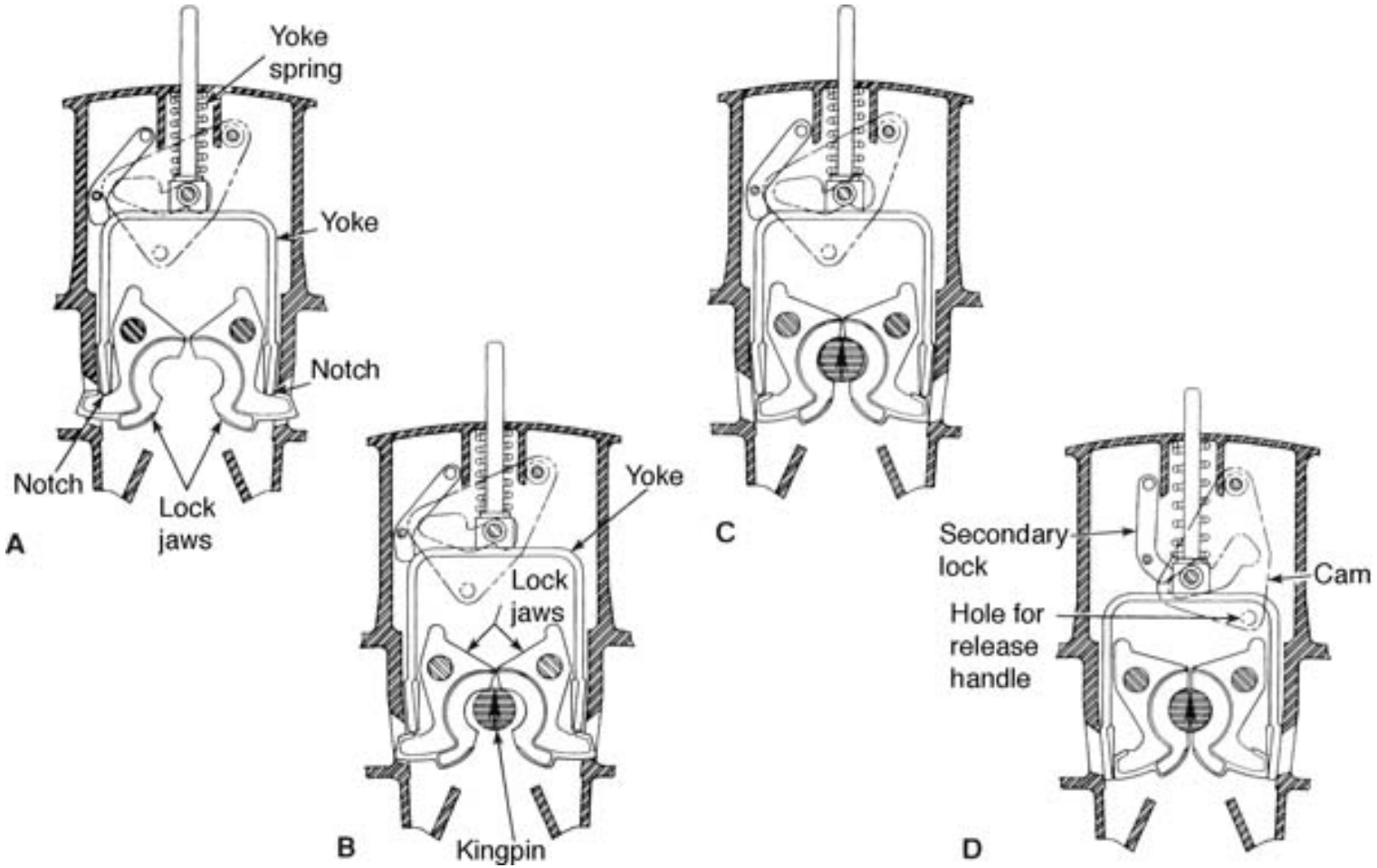
Air-Actuated Elevating Fifth Wheel



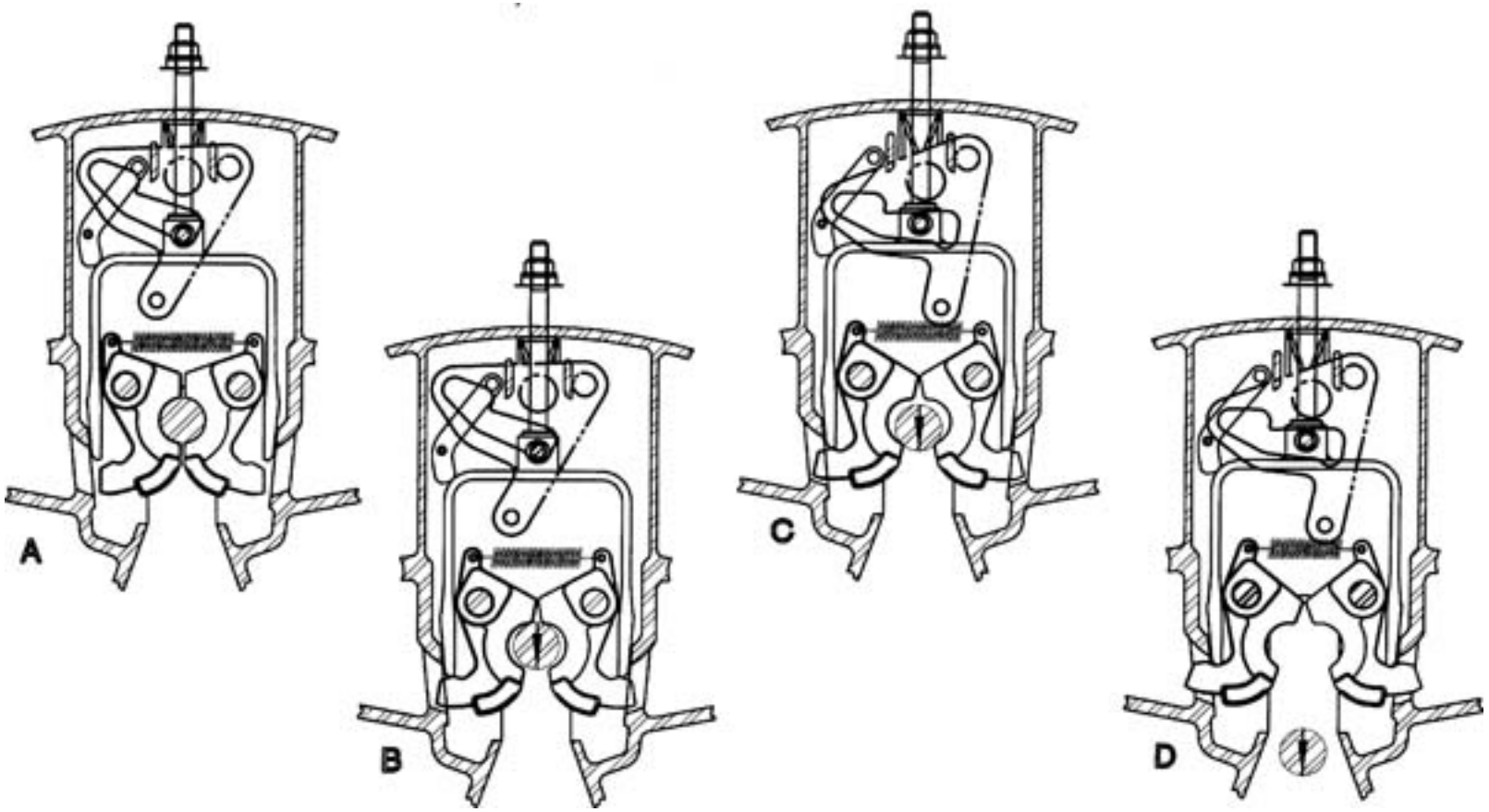
Holland Type A lock



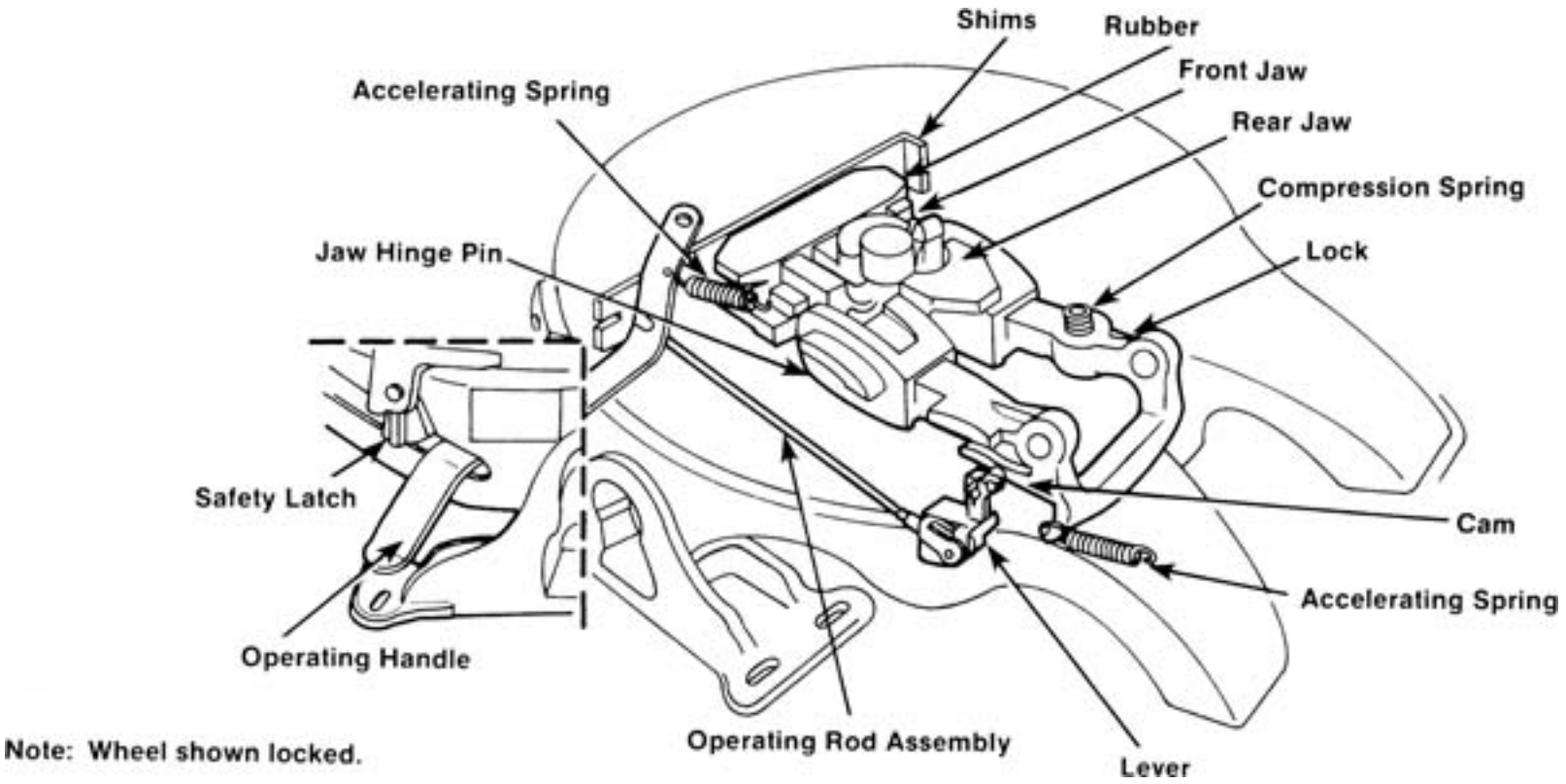
Holland Type B Coupling



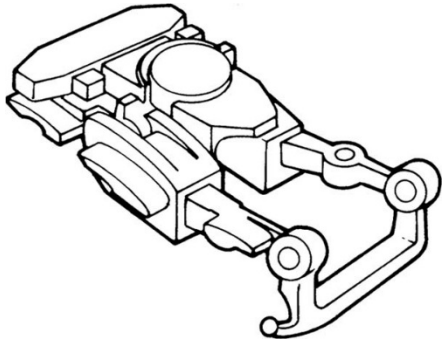
Holland Type B Uncoupling

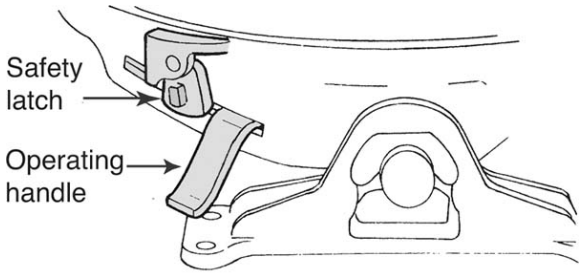


ConMet 400 Locking Mechanism

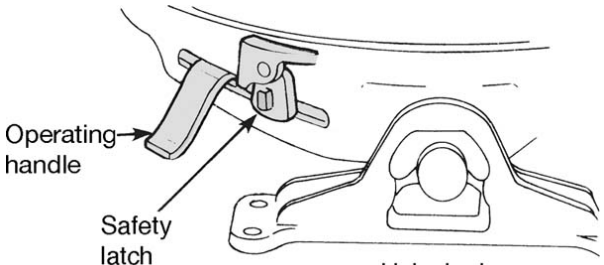


ConMet 400

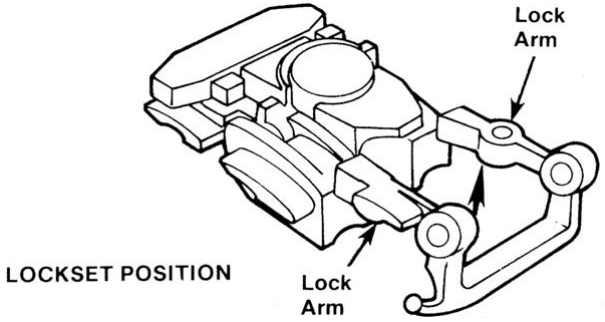


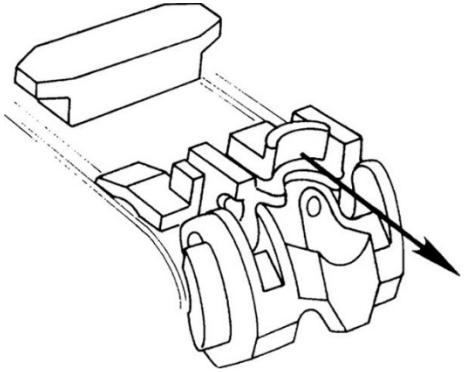


Locked



Unlocked

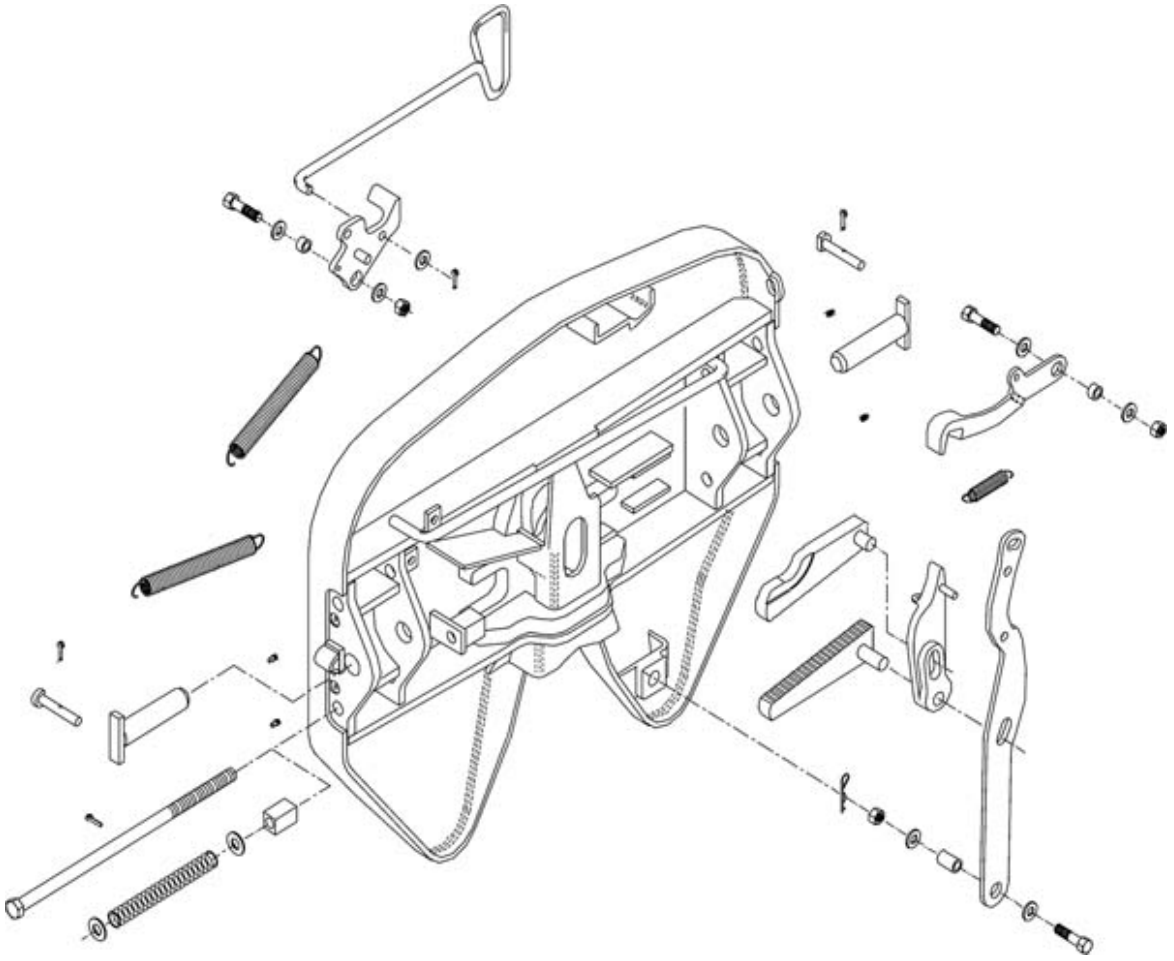




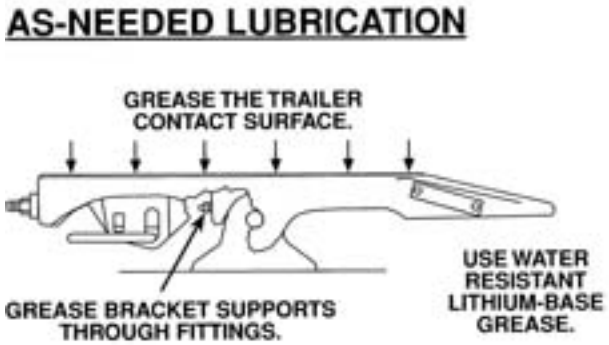
CAUTION

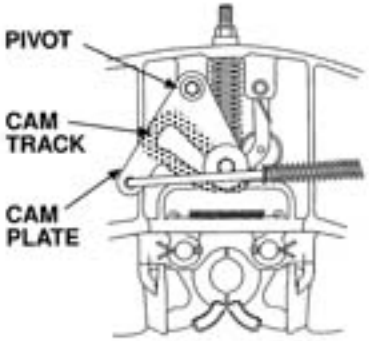
Never force the jaw pin to the next position; it must be able to be rotated by hand. Always install a new cotter pin.

Fontaine No-Slack® Fifth Wheel

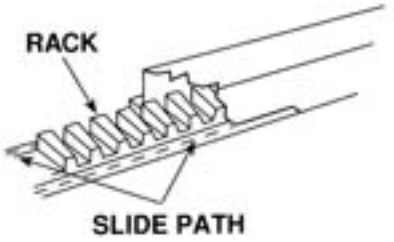


Holland As Needed Maintenance





Lubricate the cam track and pivot with a light oil or diesel oil.

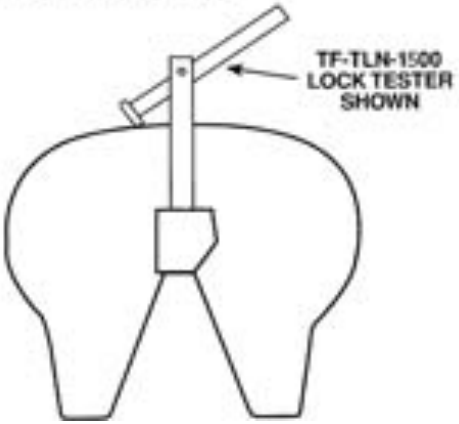


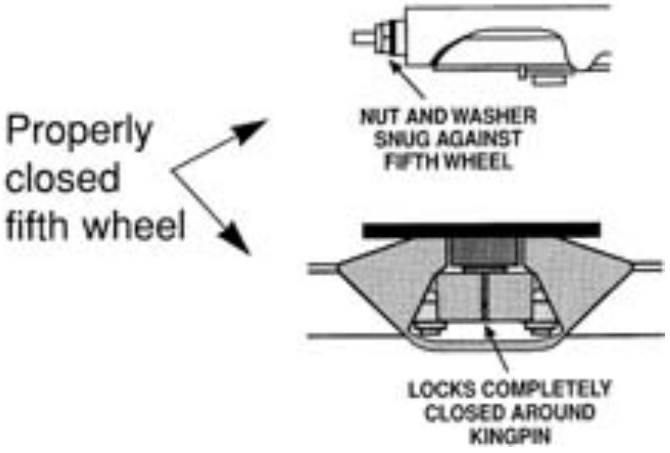
On sliding fifth wheels, spray a light oil or diesel oil on the rack and slide path.

Inspecting and Adjusting Lock Mechanism

INSPECTION – LOCKING MECHANISM:

1. Verify operation by opening and closing locks with Holland Kingpin Lock Tester model no. TF-TLN-1500 or TF-TLN-5001.

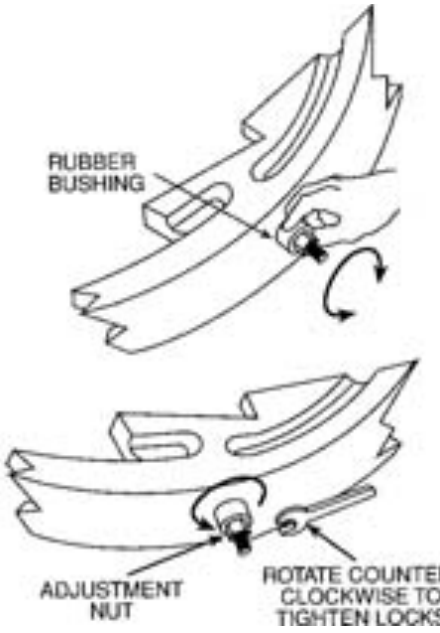




Inspecting and Adjusting Lock Mechanism

ADJUSTMENT – LOCKING MECHANISM:

1. Close locks using Holland Lock Tester.
2. Rotate rubber bushing located between the adjustment nut and casting.
3. If the bushing is tight, rotate nut on yoke shank counterclockwise until bushing is snug, but still can be rotated.
4. Verify proper adjustment by locking and unlocking with the lock tester.



The bushing should be snug, but you should be able to rotate it.

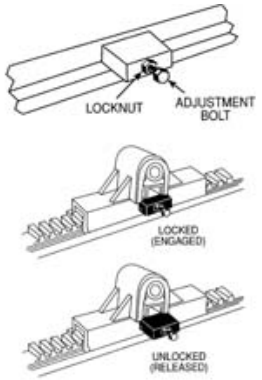
Note:

If the amount of slack is too much, do not automatically assume that the fifth wheel is the problem. Always check the kingpin for wear using a kingpin gauge.

Fifth Wheel Slide Mechanism Adjustment

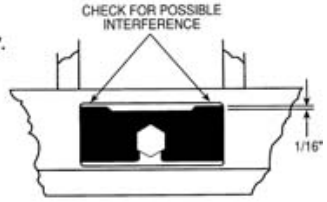
ADJUSTMENT – FIFTH WHEEL SLIDE MECHANISM:

1. Loosen locknut and turn adjustment bolt out (counterclockwise).
2. Disengage and engage the locking plungers. Verify that plungers have seated properly as shown.
3. Now tighten adjustment bolt until it contacts the rack.
4. Turn the adjustment bolt clockwise an additional 1/2 turn then tighten the locknut securely.



CAUTION: Proper adjustment of the sliding bracket locking plungers must be performed at installation and maintained at regular intervals using the adjustment bolts for both plungers. Proper adjustment is required for proper operation, load transfer, and load distribution.

5. If plungers do not release fully to allow fifth wheel to slide:
   A. Check the air cylinder for proper operation. Replace if necessary.
   B. Check plunger adjustment as explained above.
   C. If a plunger is binding on the plunger pocket, remove the plunger using a Holland TF-TLN-2500 spring compressor. Grind the top edges of the plunger 1/16" as shown. Re-install and adjust the plungers as explained above.

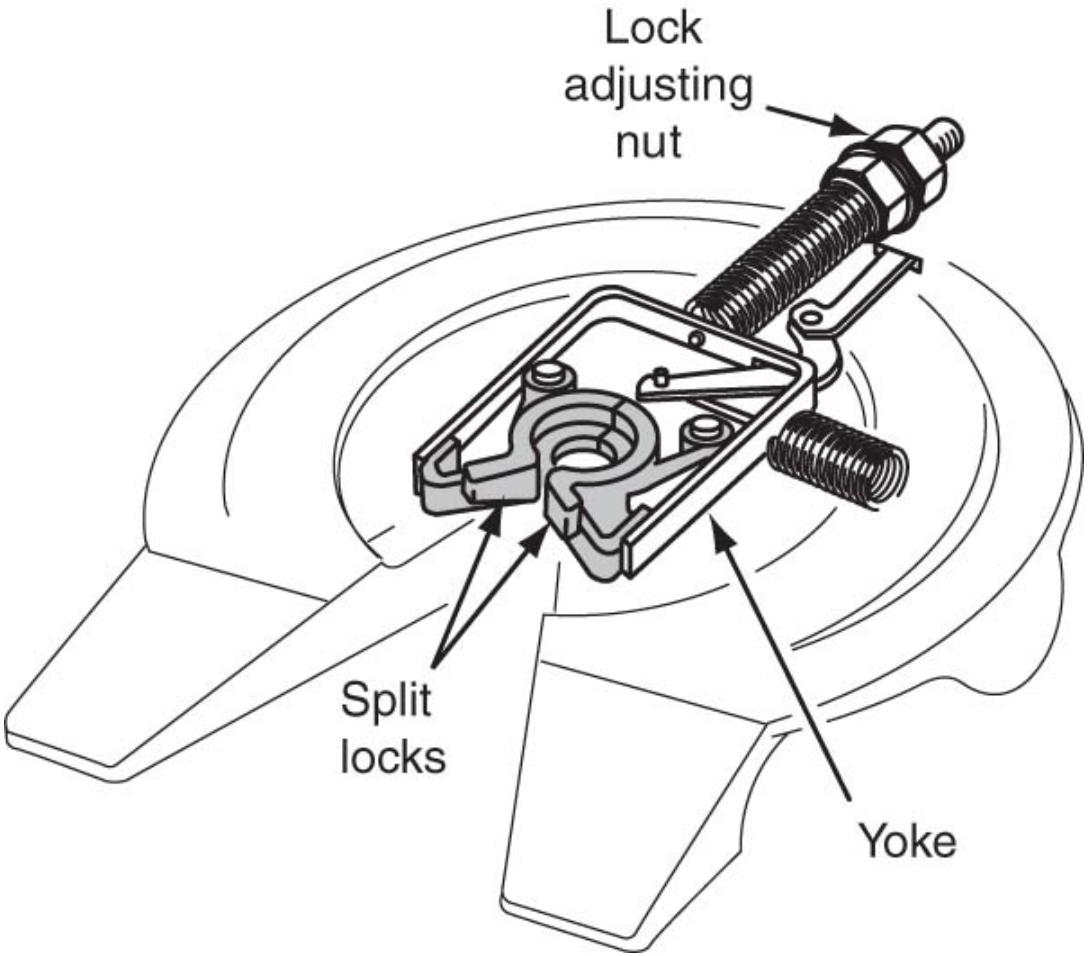


6. If the locking plungers are too loose:
   A. Check plunger adjustment as explained above.
   B. Check plunger springs for proper compression. Replace if necessary.
   C. Check for plunger wear. If necessary, replace as described above.

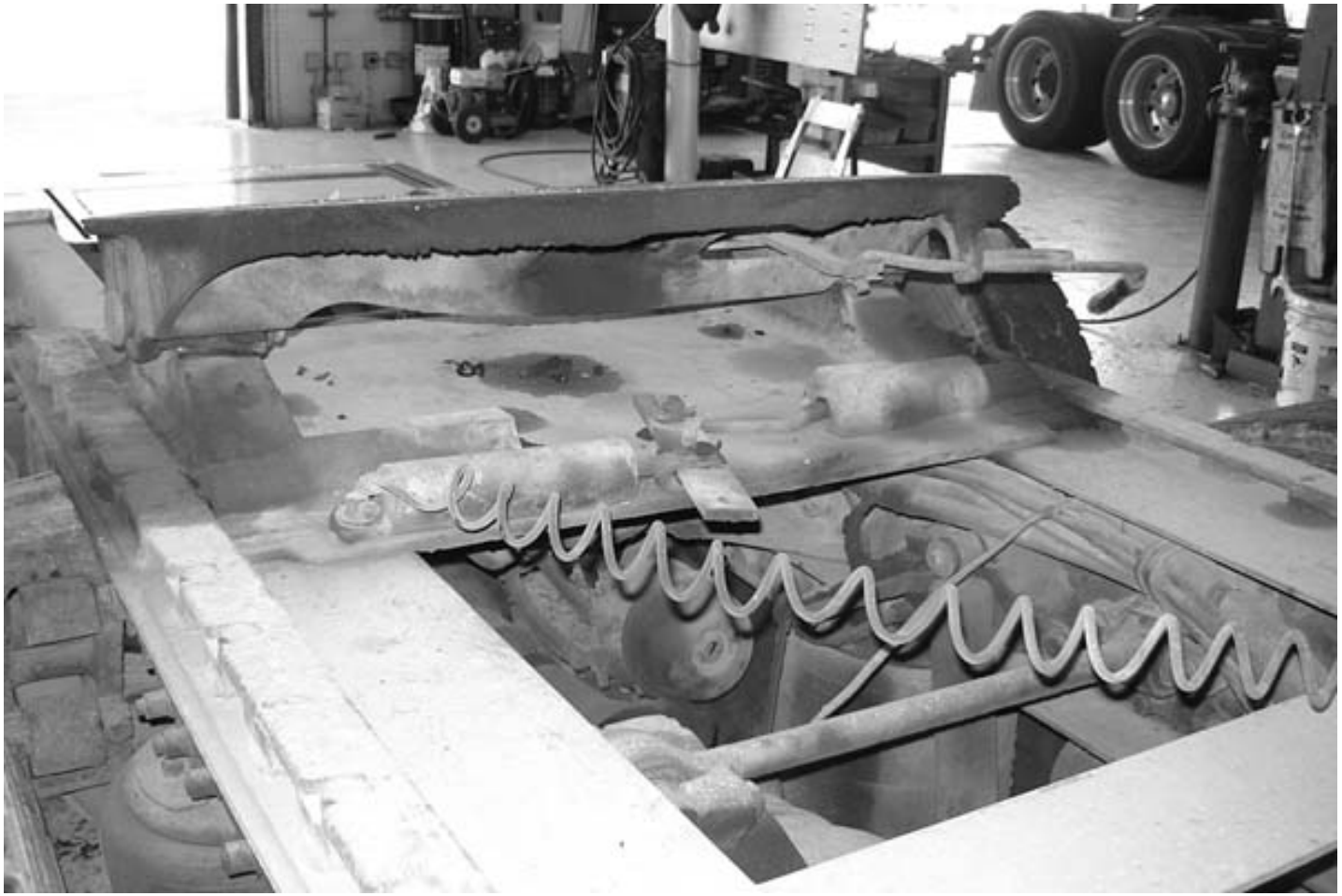
After inspection and adjustment, relubricate all moving parts with a light, rust resistant oil.

2-inch Diameter Plug

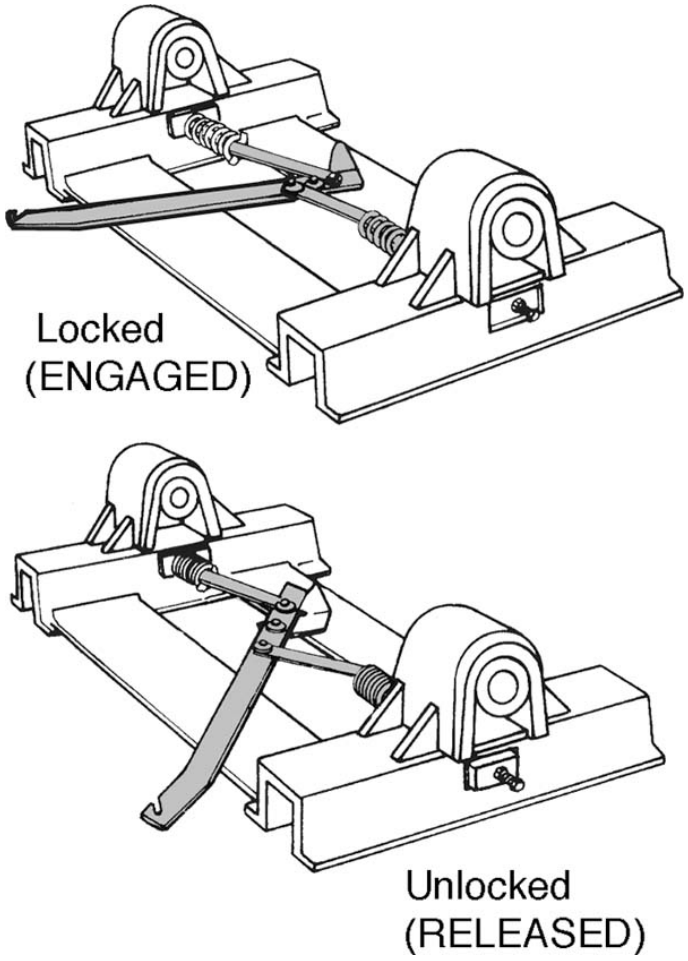
B Lock Mechanism



Air Actuated Sliding Fifth Wheel



Manual Sliding Fifth Wheel



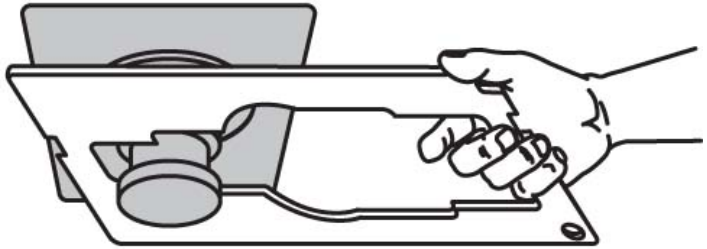
CAUTION

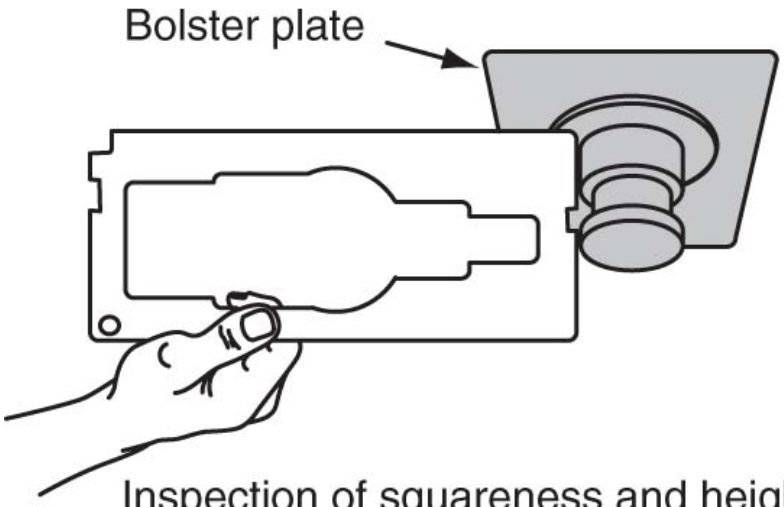
Do not operate the vehicle if the plungers are not fully engaged and the landing gear fully retracted, because damage to the tractor, trailer, and landing gear can occur.

Kingpin and Bolster Plate

Inspecting Kingpin

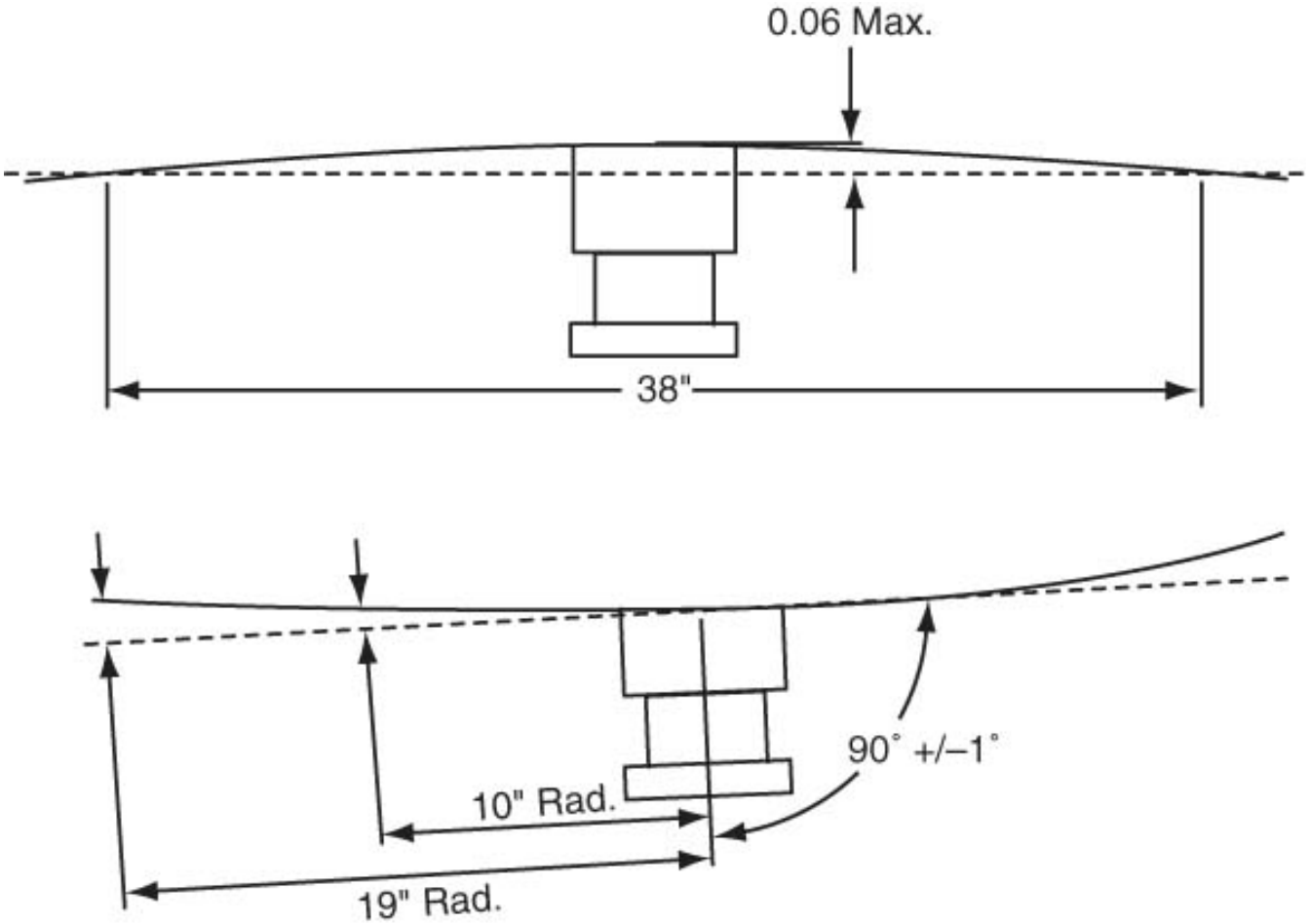
Inspection of the kingpin diameter





Inspection of squareness and height

Checking Upper Coupler Flatness



CAUTION

Attempting to couple with the trailer at an improper height could result in a false or improper coupling such as a high hitch and cause damage to the tractor, fifth wheel, or trailer.

CAUTION

To ensure that a proper coupling has occurred, a direct visual inspection must be performed. Even an improperly coupled fifth wheel can pass a pull test, and you should never rely on the sound of the jaws snapping closed; this is also unreliable. You must get out of the cab and use a flashlight to verify that the jaws are closed properly and there is no gap between the top plate and the bolster plate.

Trailer Coupling

P11-1 Inspect the fifth wheel for damaged, worn, or loose components and mountings. Be sure that the fifth wheel jaws are open and the handle is in the unlocked position. The fifth wheel must be properly lubricated and tilted down at the rear.

P11-2 Check that the trailer parking brakes are applied and block the trailer wheels as a precaution.

P11-3 Adjust the trailer landing gear so that the trailer bolster plate is just below the fifth wheel.

Trailer Coupling Continued

P11-4 Slowly back up the tractor, maintaining the alignment between the fifth wheel throat and the trailer kingpin.

P11-5 When the trailer kingpin enters the fifth wheel throat and the trailer bolster plate rides on the fifth wheel, back up the tractor until there is full trailer resistance.

P11-6 Connect the air hoses and electrical connectors between the tractor and trailer.

Trailer Coupling Continued

P11-7 Inspect the trailer bolster plate to be sure that it is supported evenly on top of the fifth wheel. No gap should be visible between the bolster plate and the fifth wheel surface.

P11-8 Inspect the safety latch, making sure that it swings freely and that the operating handle is behind the safety latch positioned to the rear of its operating slot.

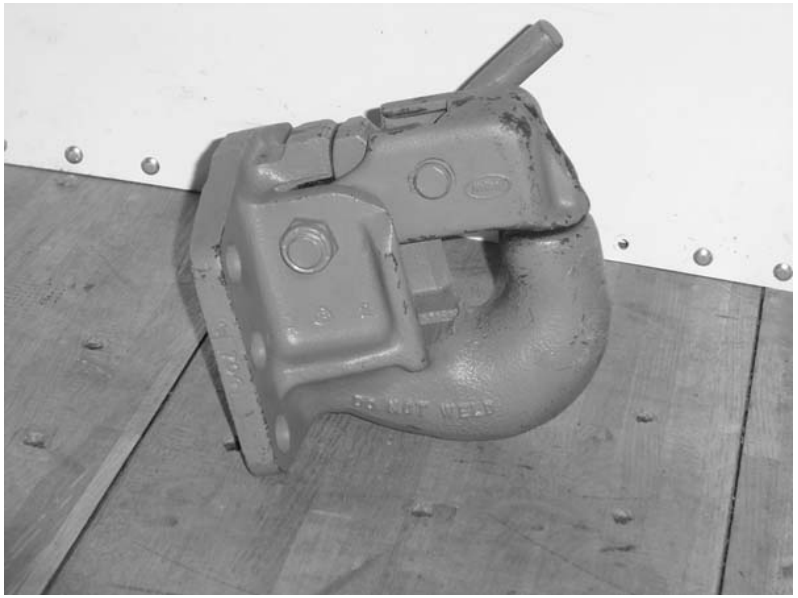
P11-9 Crawl under the tractor and use a flashlight to verify that the kingpin is properly engaged to the fifth wheel jaws.

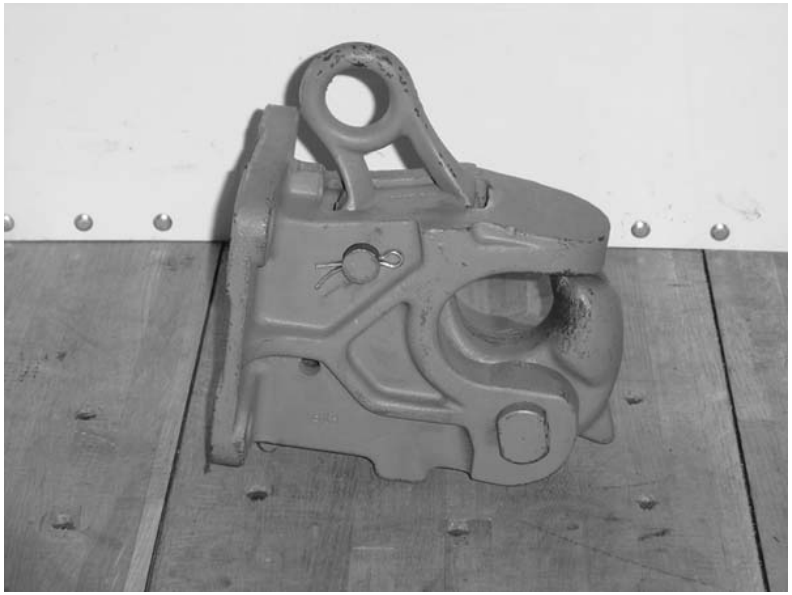
Trailer Coupling Continued

P11-10 With the trailer service brakes applied, place the transmission in the lowest gear and partially engage the clutch to create a pulling force between the fifth wheel and the kingpin. The fifth wheel jaws should remain securely locked on the kingpin.

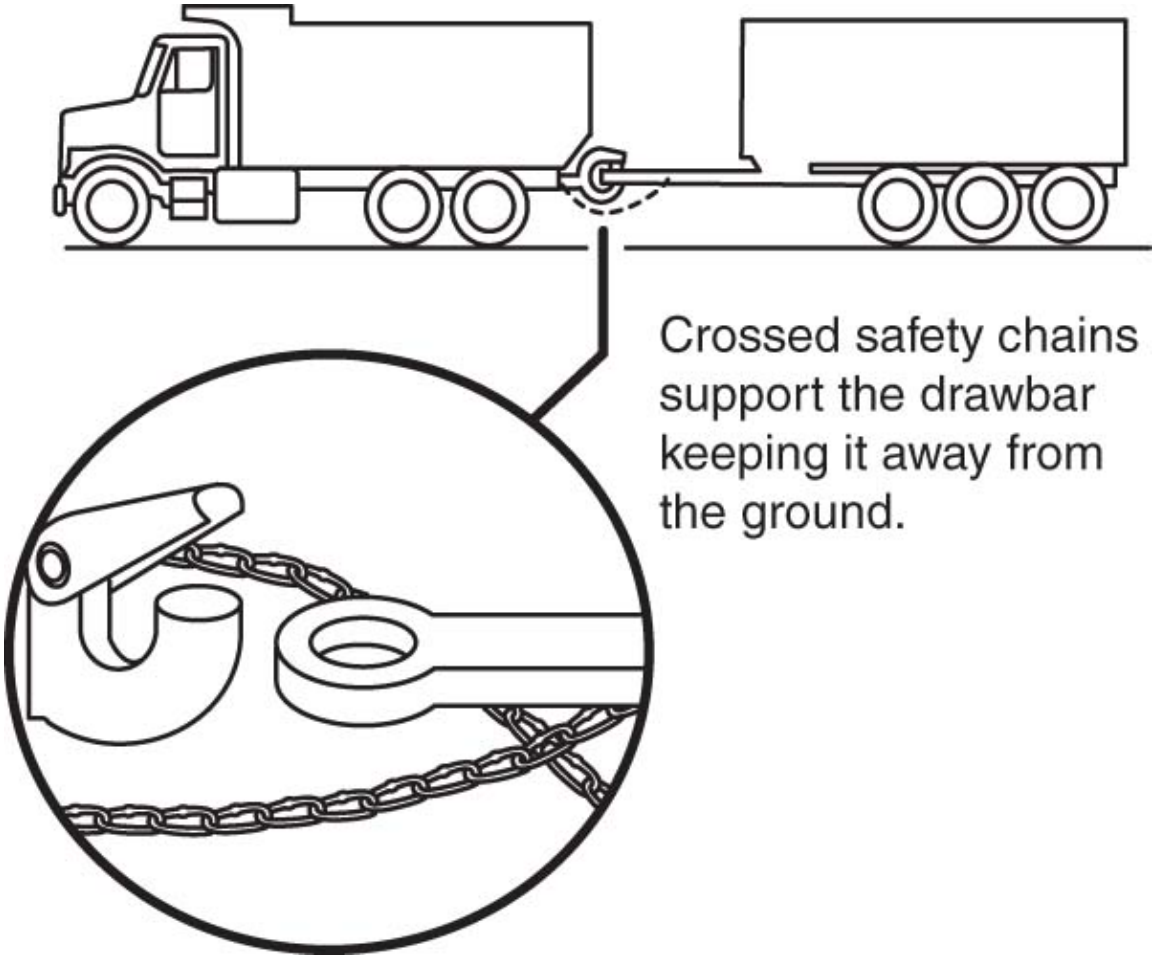
P11-11 When coupling is completed, apply the tractor and trailer brakes and crank the trailer landing gear to the fully upward position. Remove the blocks from the trailer wheels.

Pintle Hooks

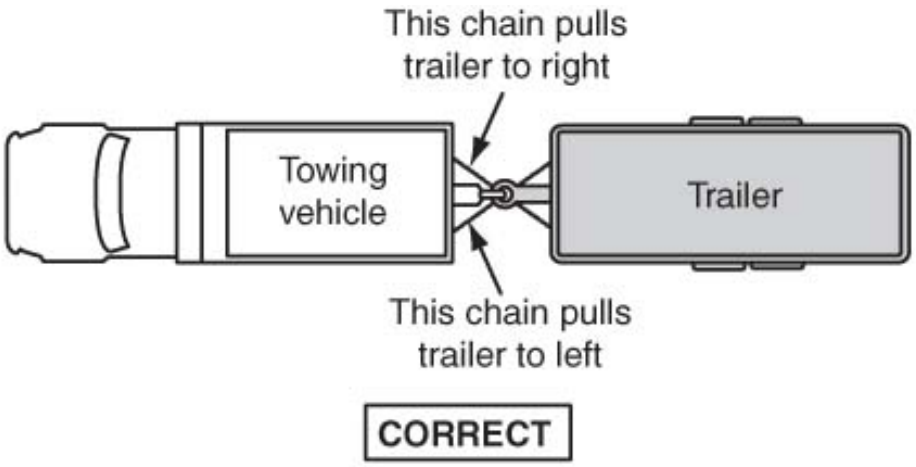


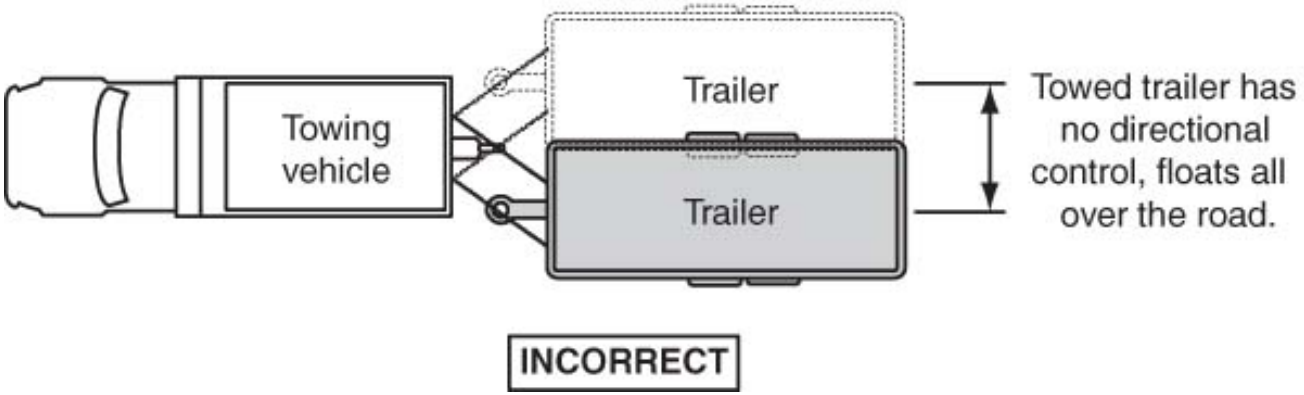


Cross Safety Chains



Safety Control Chains





Summary

- The most common coupling device in North America is the fifth wheel.
- The fifth wheel permits articulation between the tow and towed vehicles.
- The kingpin protrudes through a steel plate called a bolster plate.
- The kingpin is vital, as it holds the towing unit to the towed unit.

Summary Continued

- Each type of fifth wheel uses its own distinctive locking mechanism.
- The semi-oscillating fifth wheel is the most common style.
- A sliding fifth wheel offers the advantage of redistributing trailer weight on the tractor axles as well as the ability to change vehicle combination length.
- Before a fifth wheel on a sliding mechanism can be used to pull a trailer, the slider mechanism must be locked into position.

Summary Continued

- Because the manufacturers of fifth wheels used on highway trucks each use distinct types of locking mechanisms, the truck technician should take nothing for granted when working on them.
- The kingpin stub is mounted on the trailer upper coupler assembly. It is designed to securely fasten the trailer to the fifth wheel while still allowing rotary motion between the two units.
- During the service on a trailer, the kingpin should be cleaned and inspected for wear, integrity to the upper coupler, and cracks.

Summary Continued

- Pintle hooks, couplers, and drawbars are another means of connecting a truck to trailer or trailer to trailer.
- A pintle hook is a coupling device that uses a towing horn that is fixed.
- A coupler uses a towing horn that is not fixed but pivots.
- The drawbar is the mating part to the pintle hook or coupler in the coupling system.

Summary Continued

- All pintle hooks and couplers require the use of safety chains.
- Weld repairs to pintle hooks, couplers, and drawbars to repair a broken part or to build up a worn surface are strictly forbidden.