

*BLM # 821B*

**MOTOR VEHICLE TIRE CHAINS  
PREVENTION OF SKIDDING**

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**1. GENERAL**

- 1.01** This section outlines the practices to be followed in the use of tire chains and gives other precautions to be observed when operating a motor vehicle under unfavorable weather and road conditions.
- 1.02** Due to extensive revisions, arrows indicating changes have been omitted.
- 1.03** All tire chains referred to in this Section are of the steel (not rubber) type.
- 1.04** Tire chains are used to improve the traction of motor vehicles under adverse road conditions. Either with or without chains these road conditions require added driving precautions and reduction of speed for safe operation. There are several methods which may be followed in applying the chains to the wheels and the method which best suits the particular conditions should be selected. When the chains are no longer required for the operation of the vehicle they should be removed from the wheels, cleaned and stored for future use.
- 1.05** Letting air out of tires does not increase safety on icy roads. It slightly reduces the stopping distance when applying brakes but this small advantage is offset by increased tendency to skid on curves.
- 1.06** The reduction in stopping distance from using tire chains on ice is considerably better with special chains having cross bars or lugs than with chains having regular links.
- 1.07** When repairing tire chains, cross chains should be uniformly spaced. Standard passenger car and half-ton vehicle chains have 13 or 14 cross chains. For special conditions requiring maximum stopping ability, a considerable improvement can be made by using 16 or 17 equally spaced cross chains instead. A greater number than this should not be used.

## SECTION 720-100-010

### 2. WHEN CHAINS SHOULD BE CARRIED

**2.01** Motor vehicles which ordinarily travel on improved roads should carry tire chains as required during the period when snow or ice may be encountered.

**2.02** Motor vehicles which may be required to leave the improved roads and travel over soft ground or mud should carry tire chains as required for such emergencies.

### 3. WHEN CHAINS SHOULD BE USED

**3.01** Chains should be used when traveling through snow, over ice or in mud when the additional traction provided by the chains is required to insure the safe and continuous operation of the vehicle. The combination of requirements which will necessitate the use of chains will vary considerably. These requirements are the severity and extent of the snow, ice or mud conditions, the grades which may be encountered and the amount of traffic involved. Under certain mud conditions, however, where the mud tends to roll up and pack between the fenders and the wheels, pneumatic tires will often operate better without chains.

### 4. EMERGENCY CHAINS

**4.01** Emergency chains should not be used as equivalent to the usual full circle tire chains. By "emergency chains" is meant the type consisting of one or two cross chains and a fastening device. They can be applied to the driving wheels of a vehicle stuck in snow or mud to assist in pulling it out. At least two emergency chains, equally spaced on the wheel, should be used on each wheel to prevent damage from shock in spinning a wheel with only one chain.

**4.02** The vehicle should be moved slowly when using emergency chains as there may be a tendency for them to become unfastened. As soon as the vehicle is out of the difficulty the emergency chains should be removed.

### 5. HIGH TRACTION TREAD TIRES (Snow Tires)

**5.01** The general requirements as to when chains should be carried and when used are based on the assumption that the vehicle is

equipped with regular tread tires. When high traction tread tires are used chains will be required for the same ice conditions, but only under more severe conditions of snow or mud.

### 6. CHAINS FOR DUAL TIRES

**6.01** Where dual tires are used, chains on the outside tires only will ordinarily suffice. For maximum effectiveness dual tire chains are required but they can not be used unless there is ample clearance below the fender to permit the greater swing of longer cross chains and if there is sufficient clearance on the truck side of the inner tire.

### 7. CHAINS FOR FRONT WHEELS

**7.01** On rear wheel drive vehicles, chains should be used on the rear wheels only, unless there is some very unusual condition where the considerable additional braking or steering ability obtainable by using chains on the front wheels is necessary. Such an unusual condition might occur on snow or ice covered hilly or highly crowned roads, or in driving over slippery mud covered surfaces.

**7.02** For four-wheel drive trucks, chains may be used on front as well as rear tires.

**7.03** On front wheel drive vehicles, chains should be used on front, and may be used on rear tires.

### 8. CHAINS ON TRAILER WHEELS

**8.01** Trailer wheels with brakes should be equipped with chains whenever chains are applied to the wheels of the towing vehicle.

### 9. CAUTION IN DRIVING WITH CHAINS

**9.01** *THERE MAY BE A FALSE SENSE OF SECURITY WHEN DRIVING WITH CHAINS.* While chains improve the traction for starting and stopping under certain road conditions, there are many conditions where serious skidding will occur even when using chains, unless the driver takes into account the over-all reduced traction even with chains.

**9.02** In driving on ice, snow or mud, the car speed on the straight road should be materially reduced so that the vehicle will be in complete control under the driving conditions. Turns and corners should be taken slowly and carefully.

**9.03** On slippery roads allow maximum spacing and clearance from all other vehicles.

**9.04** In starting on ice, snow or mud let the clutch in very slowly and accelerate gradually. If it is found that the power cannot be gradually applied in low gear a higher gear should be used for starting the vehicle. A spin of the wheels on ice may start a skid and in snow or mud it may start the chains to "cutting in" instead of moving the vehicle. In going through mud the continued momentum of the car is of great assistance so that it is best to keep moving if possible rather than to stop and try to start again.

**9.05** When it is desired to slow down or stop the vehicle on snow or ice, if practicable the start to decelerate should be made early enough so that the engine will do nearly all of the braking. In any case leave the clutch engaged until the vehicle is almost stopped. When driving on slippery roads the car should be kept in gear. In applying the brakes they should be applied softly enough that the wheels will not be locked. Sometimes this is best done by intermittent brake applications.

**9.06** The most common type of skid occurs when the rear end of the vehicle moves sidewise out of line with the front wheels. If there is road space available the best method of stopping a sidewise skid is to steer the front wheels toward the side where the rear is going until the car straightens up with the road. Steering away from a skid makes it worse.

**9.07** Since uneven brake adjustment or misalignment of wheels may cause serious skidding even if all precautions in driving are taken, such conditions should be reported and corrected as soon as they are noticed.

**9.08** Added caution and materially reduced speeds are necessary when driving on slippery roads with high crowns or when driving in icy ruts. To get out of an icy rut it may be of

assistance to backup in order to obtain the advantage of the chains on the rear wheels.

## **10. SKID PREVENTION WITHOUT CHAINS**

**10.01** Chains should not be used on improved roads where ice or snow is not encountered. However, when these roads are wet all the precautions in driving listed under Part 9 should be observed although speeds may not need to be reduced to quite such a degree as when driving on ice.

**10.02** Under these conditions the greatest danger occurs when driving on a wet paved road, on the surface of which is a certain amount of foreign material such as soil from unimproved side roads, leaves, and oil drippings from cars. Such a pavement is very slippery when first wet at the beginning of a rain. Under such conditions extreme caution should be exercised in driving. Speed should be reduced. Curves and corners should be taken slowly. A hard rain will ordinarily wash off the pavement so that it is not quite as slippery even though wet.

**10.03** Some types of asphalt, when wet, wood block or similarly surfaced pavements are the most likely to cause skidding.

## **11. ADJUSTMENT OF CHAIN TO TIRE**

**11.01** When properly adjusted on the tire the chain cross links will lie loosely over the tire and will not have enough slack to strike the fender. A chain pulled tightly over the tire cannot creep and will therefore bind and tend to cut the tire.

**11.02** Where the clearance for the chain is limited it may be necessary to use spring tighteners consisting of coil springs which are attached to the outside circle of the chain and pull it toward the hub. Tighteners should not be used unless made necessary by close clearances.

**11.03** When the chain is adjusted to the tire there should not be more than four side chain links between cross chains. If the length of the chain is such that the distance between the end cross chains exceeds this amount a cross chain should be added.

**12. METHODS OF PUTTING ON CHAINS**

**12.01** There are five methods in general use for putting on tire chains. They differ primarily as to the method used in placing the chain on the tire, since the locating and fastening operations are similar for all methods. The method best suited to the particular conditions should be selected.

**13. LAYING OUT THE CHAIN PREPARATORY TO PLACING**

**13.01** Unless chains are put on properly the fasteners may open. Regardless of the method to be used in applying the chain to the wheel, it should be laid out with respect to the tire so that when the chain is on the wheel any slipping of the tire tending to drag the side chain against the snow or mud will tend to keep the fasteners closed.

**13.02** For nearly all types of fasteners now in general use the proper direction should be such that the drag will tend to open the fastener tongue against a locking device.

**13.03** On driving wheels, the proper direction for most fasteners is such that when the vehicle moves forward the fastener end will strike the ground before the other end of the chain.

**14. FASTENING THE CHAIN**

**14.01** The method of fastening the chain is practically the same for all placing methods. The inside chain should be connected by pulling the necessary slack toward the inside of the tire. The outside chain is then connected by pulling it together. Additional slack for fastening the outside chain can often be secured by hooking the chain temporarily and, while holding tension on it, moving the cross chains around the tire toward the gap. (See Fig. 1.)

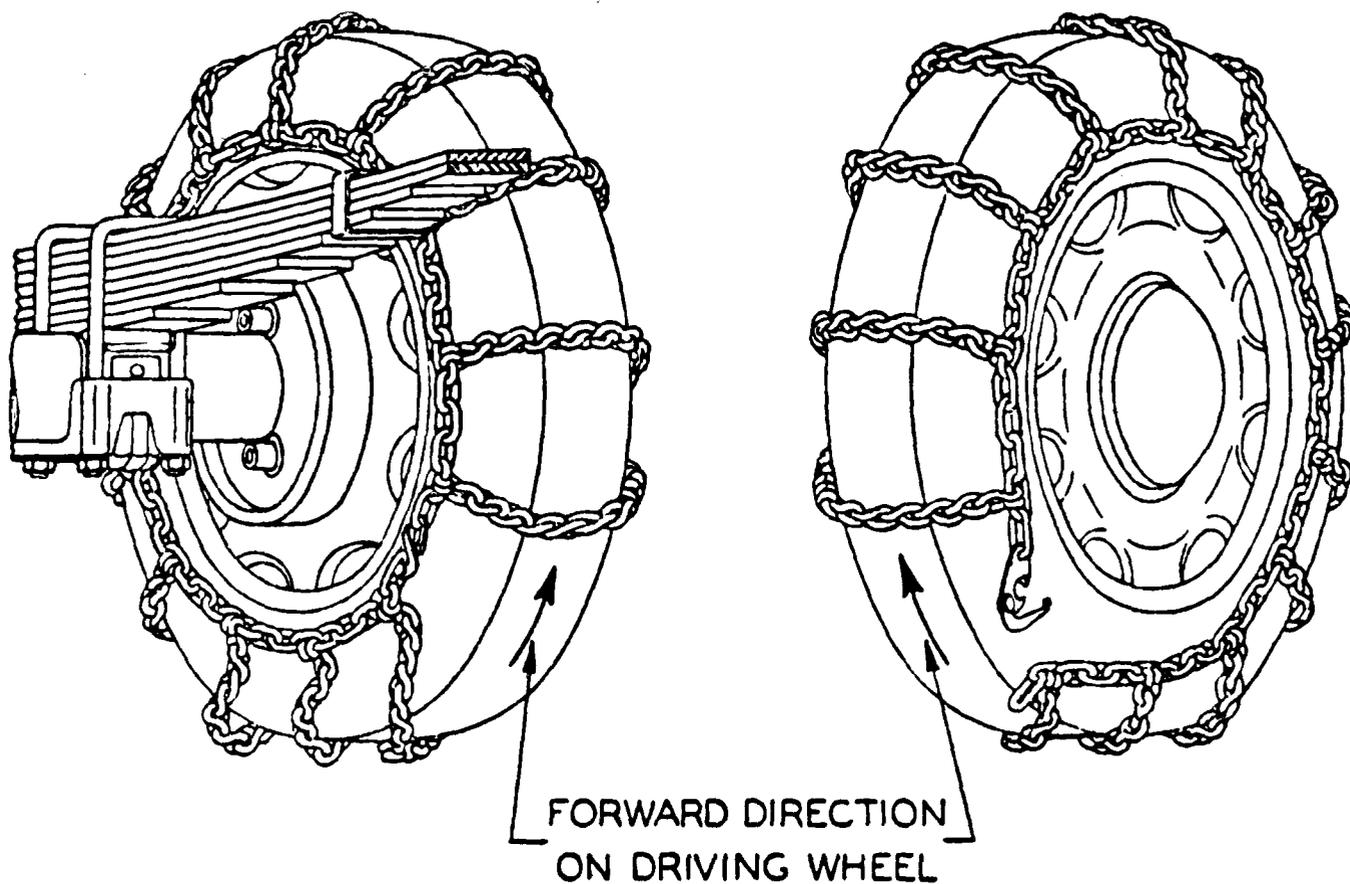


Fig. 1

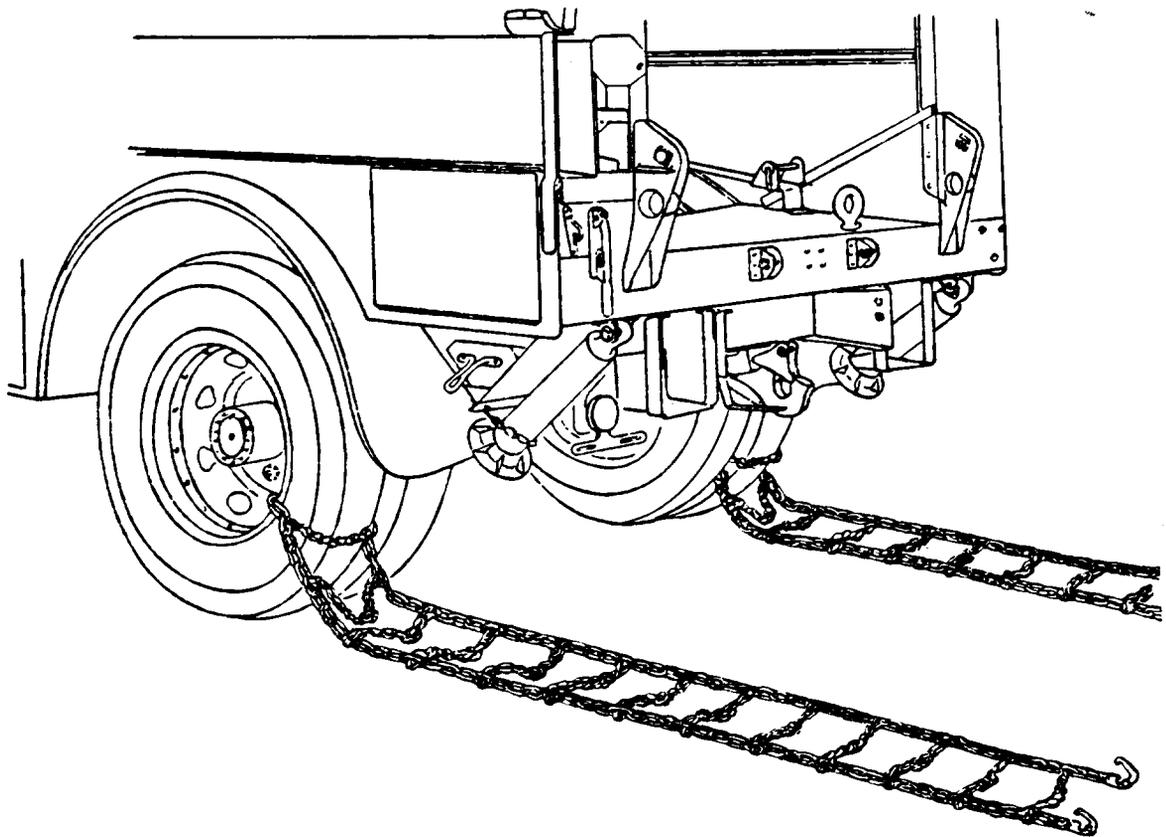
**15. METHOD—PULLING CHAIN ON BY WHEEL ROTATION**

**15.01** This method will be found desirable for putting on all chains and particularly heavy truck chains where it is convenient to drive the vehicle forward or backward approximately the length of the chain. The chain should be laid out as described in Part 13. (See Figs. 2 and 3.)

**15.02** The end links or fasteners of the side chains should then be attached to the wheel and tire in a direction that will properly place the chain by pulling it over the top of the tire as the wheel rotates. The attachment should

be made by means of a small rope or wire or by means of a commercial spring clamp made for this purpose.

**15.03** The vehicle should be driven forward or backward as required to pull the chain over the top of the wheel. The wheel should move far enough to carry the chain around the tire, leaving the chain ends to be connected at a convenient location in the arc between the fender and the point where tire rests on chain. This motion will be about one revolution of the wheel. The tie should then be removed and the ends fastened. Make connections in accordance with Part 14.

**Fig. 2**

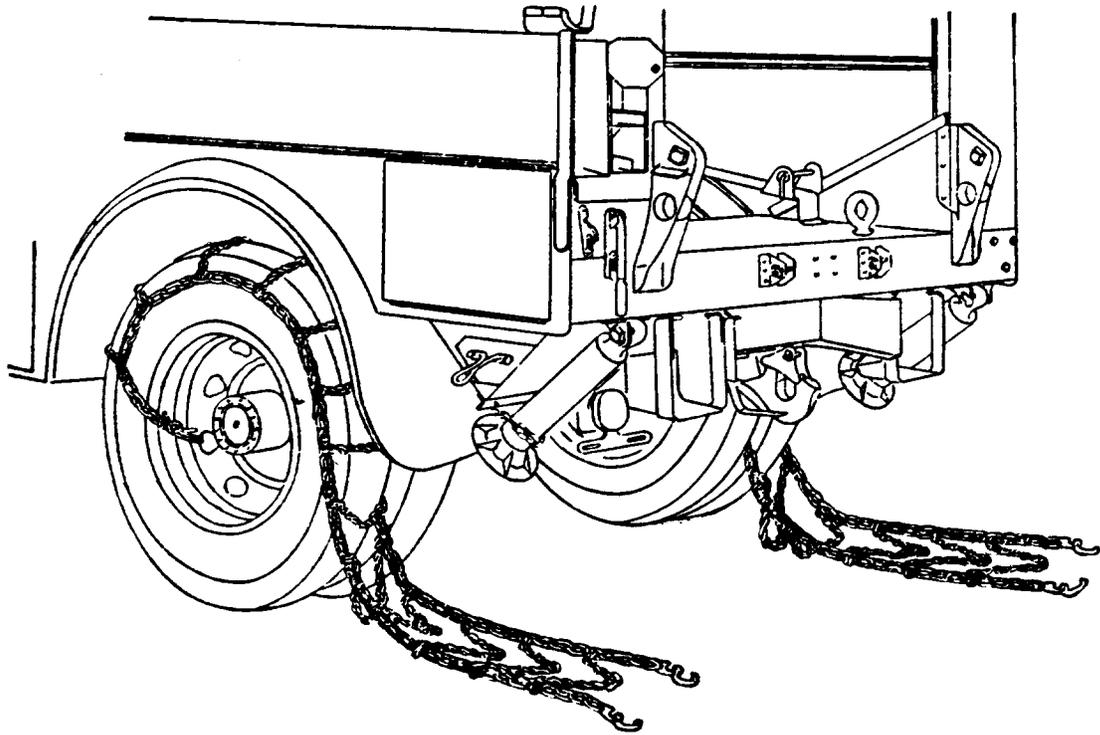


Fig. 3

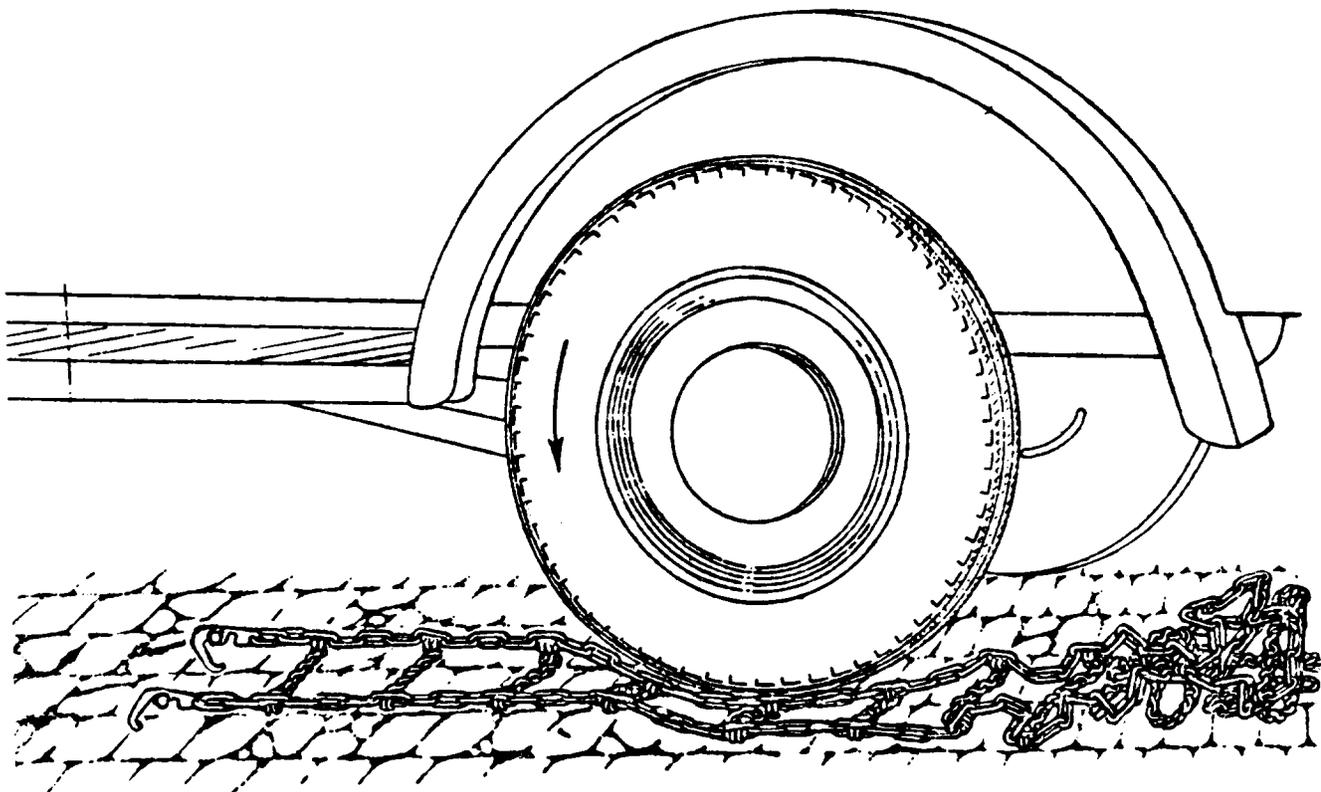


Fig. 4

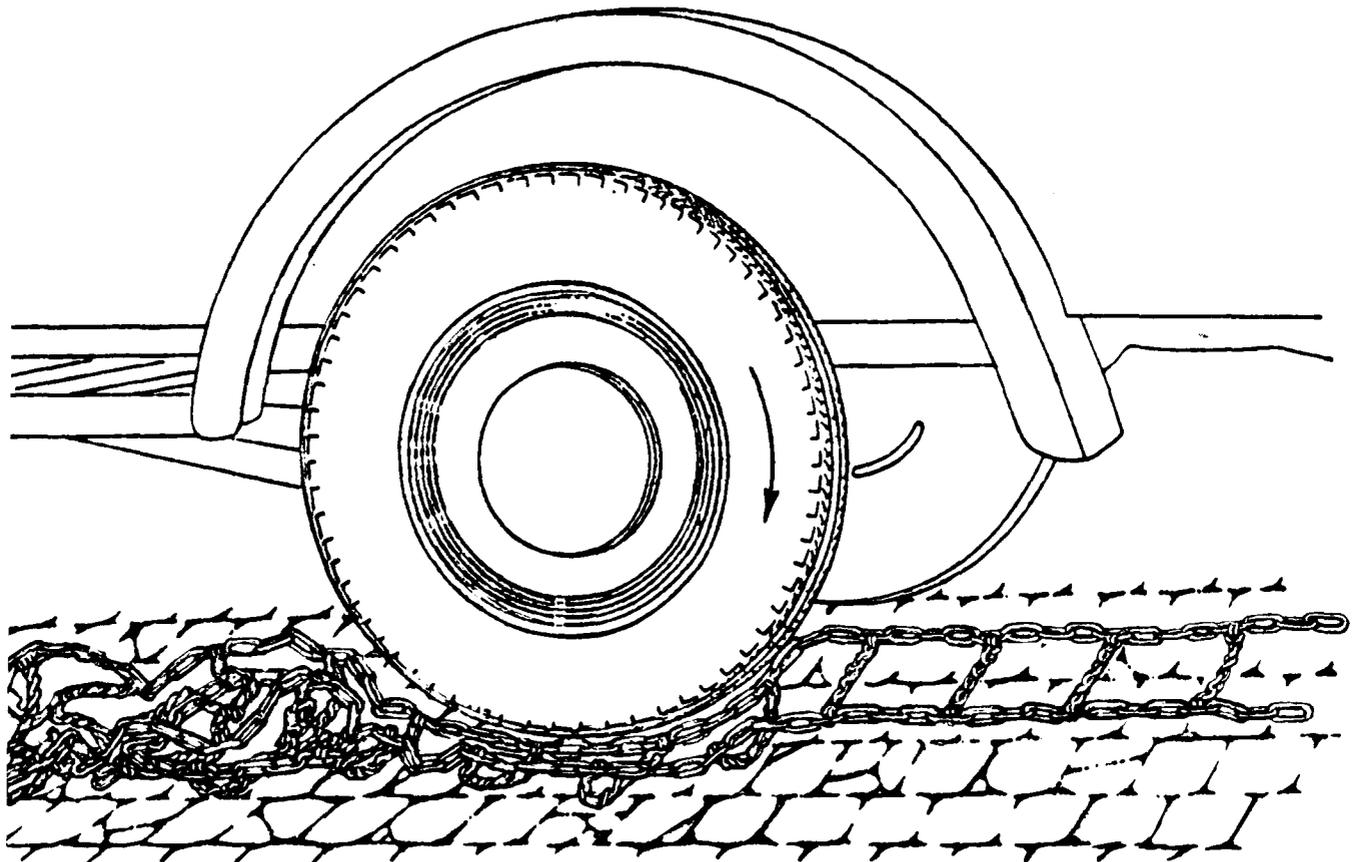
**16. METHOD—ROLLING VEHICLE ON TO THE CHAIN**

**16.01** When it is convenient to roll the vehicle only a foot or two either forward or backward, this method will probably be found convenient.

**16.02** The chain should be properly located as outlined in Part 13. About one-third of the chain should be laid out on the supporting sur-

face ahead of or behind the wheel. Then the far side chain should be laid across just under the tire, so that the wheel can be rolled onto the laid-out portion, with the least possible movement of the wheel. (See Figs. 4 and 5.)

**16.03** The vehicle should then be rolled onto the laid-out portion of the chain and the remainder of the chain pulled up over the tire. The chain ends should then be fastened near the ground line as outlined in Part 14.



**Fig. 5**

**17. METHOD—HANGING CHAIN OVER THE WHEEL**

**17.01** This method will be found desirable when the vehicle is parked on a firm surface and where it is inconvenient to move it during the operation of putting on the chain.

**17.02** The chain should be properly located for direction of rotation as discussed in

Part 13. It should be picked up at its midpoint and hung over the tire with the midpoint at the top of the wheel. The ends should then be brought together at the floor line and fastened. If the number of cross chains is large with respect to the circumference of the tire, a slight forward and backward rocking motion of the vehicle may be necessary to provide the slack required to fasten the side chains. (See Fig. 6.)

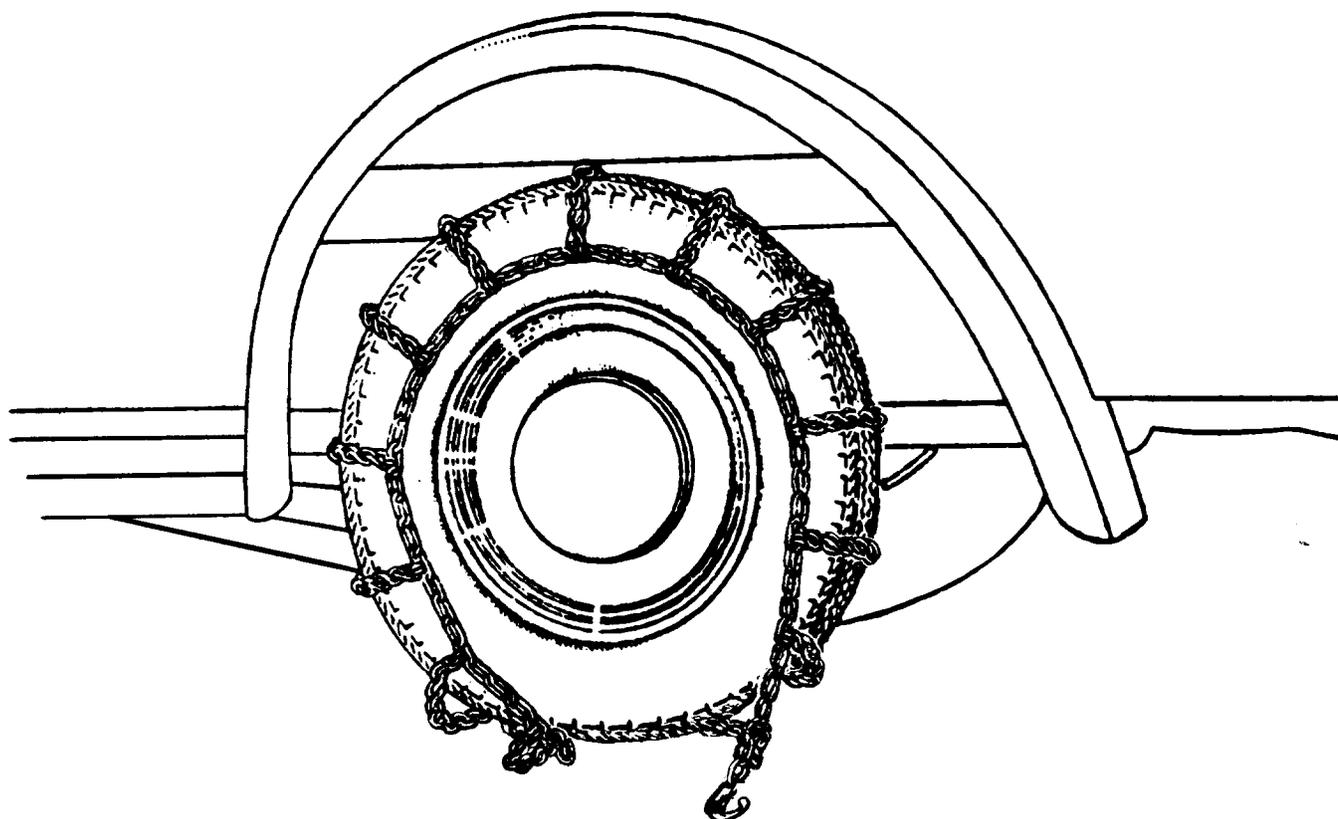


Fig. 6

**18. METHOD—LIFTING THE WHEEL**

**18.01** When a jack is available, the wheel may be raised and the method outlined in Part 17 followed. In this case it is desirable to fasten the chain either just in front or just to the rear of the point where the wheel would contact the supporting surface. This method will have some advantages where the vehicle is equipped with deep

skirt fenders and can be raised with a bumper jack.

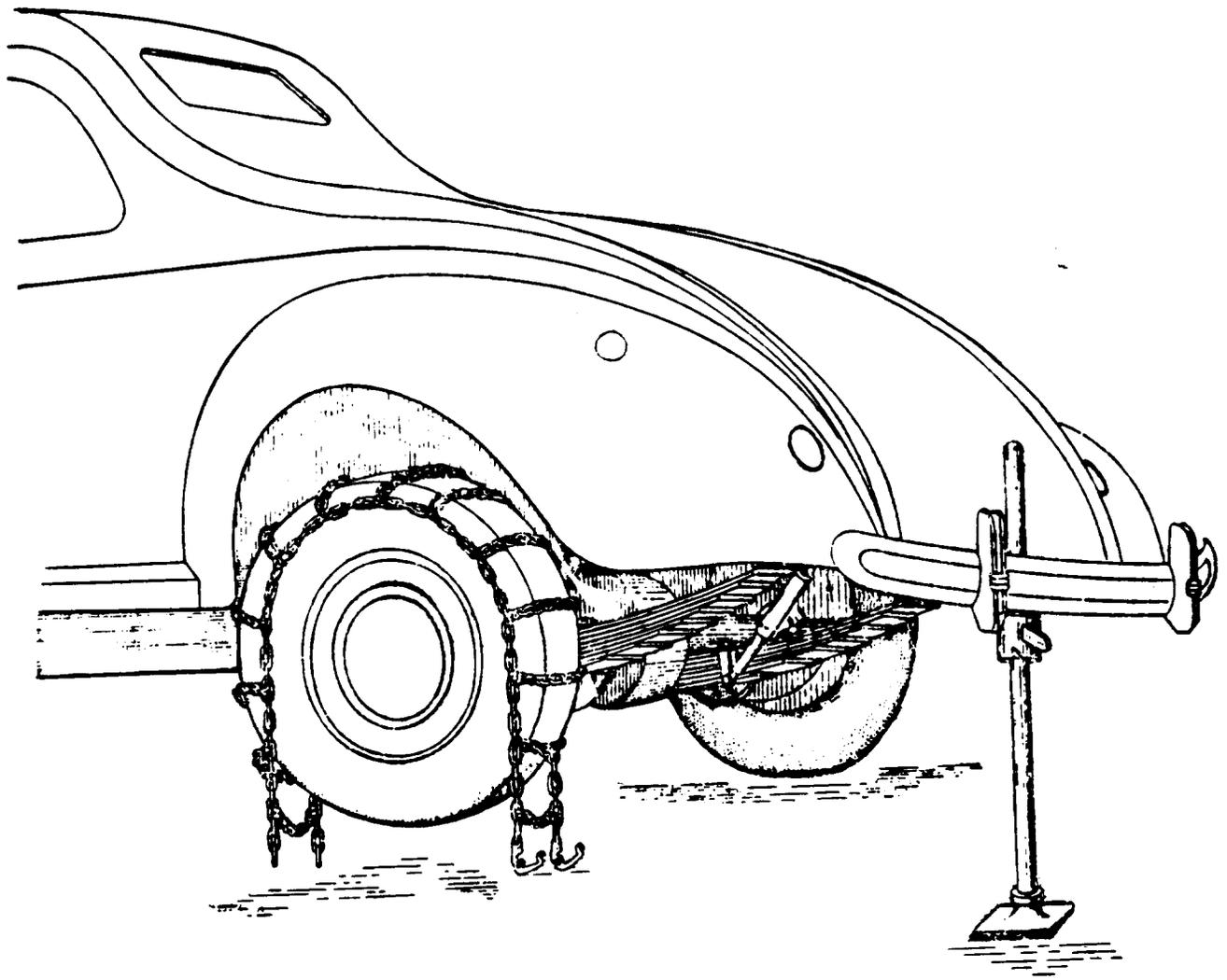
**19. METHOD—PLACING CHAINS ON VEHICLE STUCK IN SNOW OR MUD**

**19.01** When placing chains on a vehicle which is stuck in snow or mud, if it is possible to raise the wheel, the method outlined in Part 18

should be used or if the wheel cannot be readily raised, a modification of the method outlined in Part 15 should be used. (See Figs. 7 and 8.)

**19.02** The end of the chain must be more securely attached to the wheel than for condition

shown in Part 15. The wheel should be rotated very slowly and the chain so laid out that it will wrap around the tire, top first. Fastening should be done at the most accessible point. The chain may be fed onto the wheel from the front or the back whichever is found more convenient.



**Fig. 7**

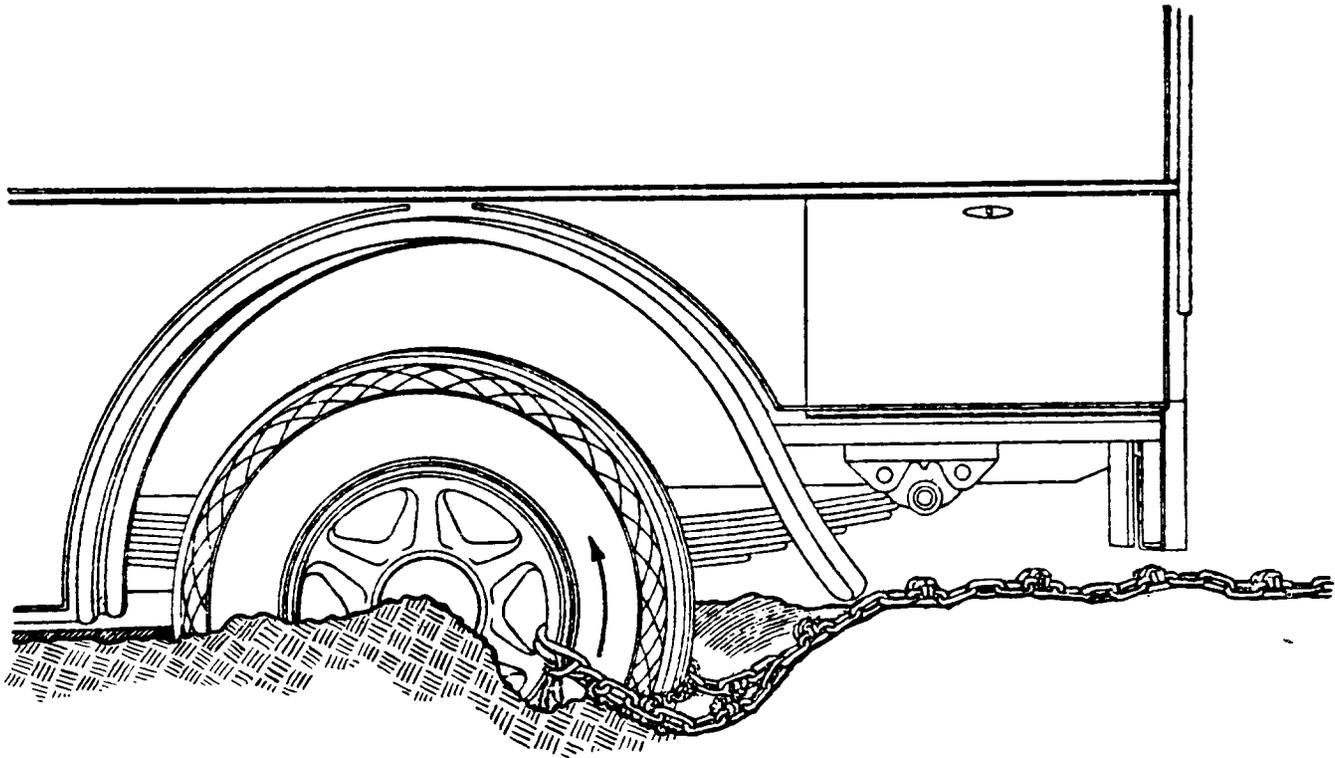


Fig. 8

## 20. REMOVING CHAINS

**20.01** As soon as the chains are no longer required for the operation of the vehicle they should be removed from the wheels.

**20.02** A suitable location should be selected for parking the vehicle where the removal can be done safely and conveniently. The wheel should be stopped at a point where the chain fasteners are accessible.

**20.03** The chain fasteners should then be disconnected starting with the outside fastener. The chain should be pulled off the wheel and laid on the ground. It will then be necessary to move the vehicle a few feet to roll it off the chain.

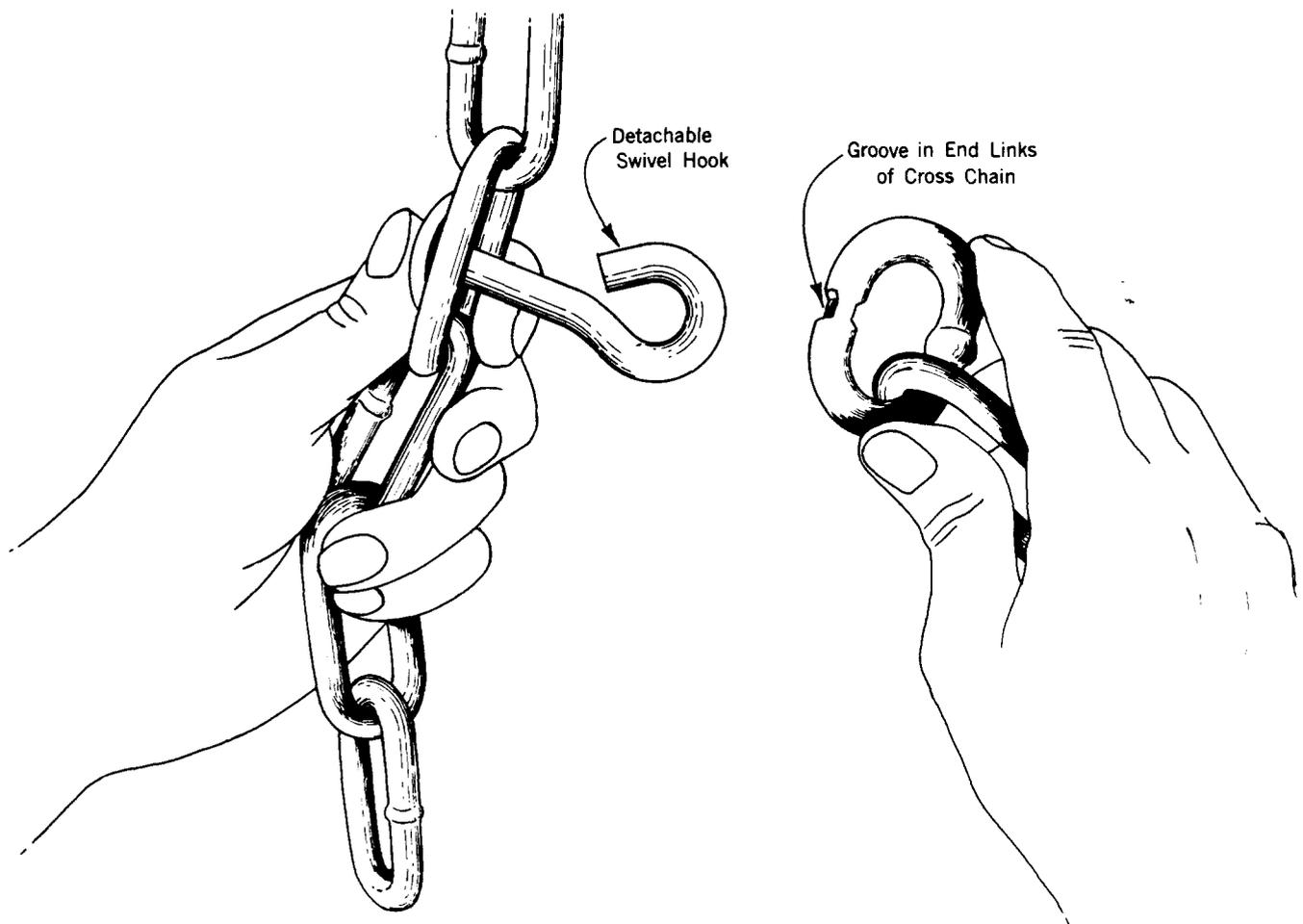
**20.04** The chains should be washed or permitted to dry and be cleaned by shaking. They should be put into a sack or compartment in the vehicle where they will be readily accessible for future use.

## 21. ROLLER GRIP TIRE CHAIN

**21.01** The Roller Grip Tire Chain shown in Figs. 9, 10 and 11 uses swivel hooks to connect the cross chains to the side chains. The end links of the cross chains are grooved to permit connecting to the swivel hooks without tools. This permits simple repair of any broken or worn cross chains with the tire chain still on the tire.

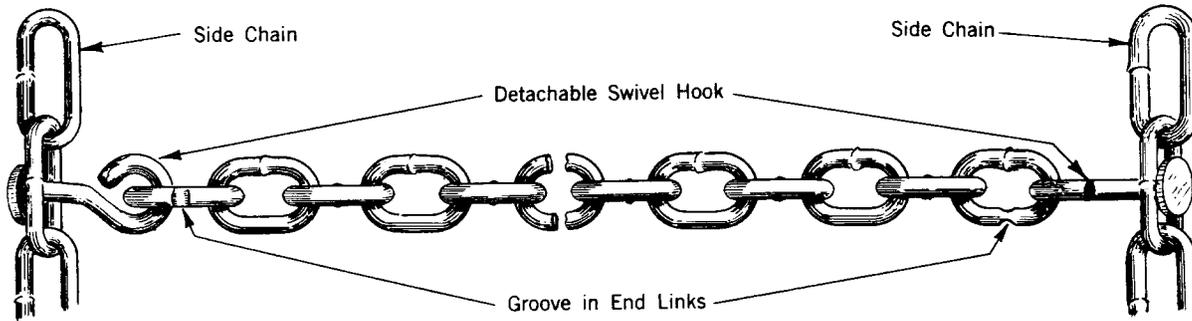
**21.02** The swivel hooks and cross chains may be used in the repair of any type of tire chain.

**21.03** The Roller Grip Tire Chain is equipped with an inside hook fastener which may be engaged or disengaged with very slight effort, not requiring any locking. It is particularly advantageous for ease in removing the chains. After disengaging the outside locking fastener, the inside fastener will shake free.

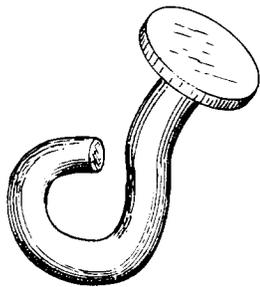


ATTACHING CROSS CHAINS

Fig. 9



CROSS CHAIN AND SWIVEL HOOK ASSEMBLED TO SIDE CHAINS

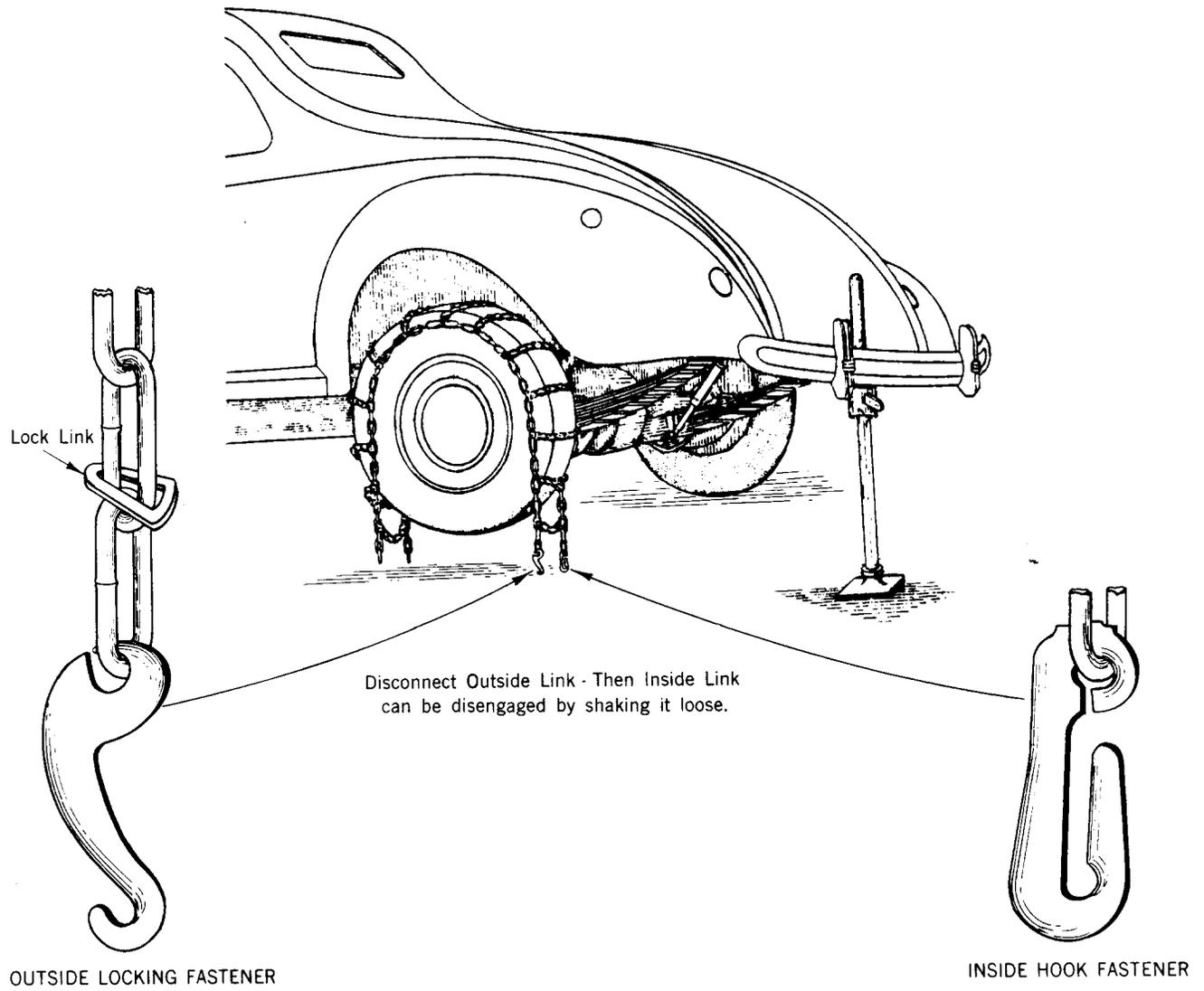


Detachable Swivel Hook  
Truck and Tractor



Detachable Swivel Hook  
Passenger and Light Truck

Fig. 10



ATTACHING OR REMOVING ROLLER GRIP TIRE CHAIN

Fig. 11