

79.01.23

INTRODUCTION

Tools and equipment must be used correctly to avoid injury, to yourself and fellow employees. You cannot do your job properly unless you know how to use the specialized tools in a proper manner.

On the track you must always be prepared for the unexpected. Following safe work practices will help to keep accidents to a minimum.

MAIN POINTS

1. Tools
2. Safe Lifting and Handling
3. Track Motor Car
4. Use of a Track Line-up
5. Safety
6. Use of Radios and Phones

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## 1. TOOLS

### 1.1 Inspection - General

All tools should be inspected before being used. A good time to inspect them is when loading or unloading tools from a track motor car or truck. Any tool that is unsafe should be set aside and marked for repair. Common defects are broken or cracked handles and burred faces on spike mauls, sledge hammers and track chisels. Each trackman is responsible for the safe condition of the tools he uses. Any defect should be reported to the Foreman who must inspect all tools periodically.

### 1.2 Claw Bar - Description, Use, and Maintenance

A claw bar is approximately 4 feet long and weighs approximately 28 lbs. It has a claw at one end and a pinch or nipping taper at the other. The main use is for pulling spikes.

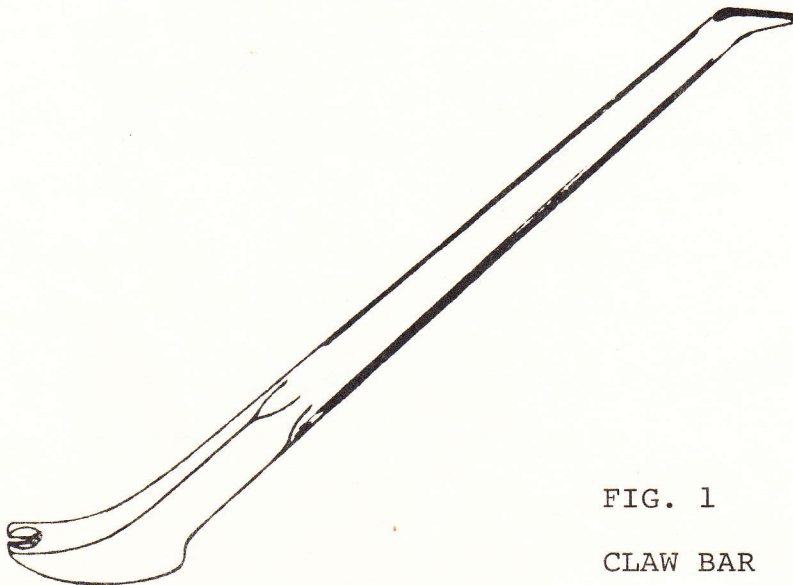


FIG. 1

CLAW BAR

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Use

- a) Take a good hold on the bar so that it does not slip. Be sure that the jaw end of the bar is completely on the spike. Never hold the bar with one hand on the pinch end. When first taking hold of the spike with the claw bar, both hands should be in the middle of the bar and as the spike is being removed one hand stays in the centre of bar, the other moves toward the pinch end.
- b) When pulling spikes on the inside or gauge side shorten



FIG. 2

the distance between the two hands to hold the bar firmly, otherwise the fingers may be jammed between the bar and opposite rail when pressure is applied. Be sure to have good footing with both feet on one side of the bar.



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A spike is removed by a jerking motion, not by applying continuous pressure.

- c) When carrying a claw bar, do not carry it over the shoulder. Carry it in a safe manner to avoid injury to yourself and other trackmen.

When pulling a spike that is difficult to remove:

- a) Tap the head of spike with a spike maul to loosen it (do not tap with the claw bar). If still hard, put two men on one claw bar one on each side applying pressure-extra caution is required here.
- b) Place a track spike under the foot of the claw bar, this will give more leverage. Apply pressure as before. Increased leverage can be gained by placing something thicker than a spike under the bar such as a spike maul, after the spike being removed has been raised slightly.

This method will prevent the spike from bending when it is being removed.

#### Pulling Spikes in a Turnout

- a) The same methods apply except in the heel and guard rail areas, where spikes cannot be grasped by a claw bar.
- b) In this case a spike puller is used with the claw bar.



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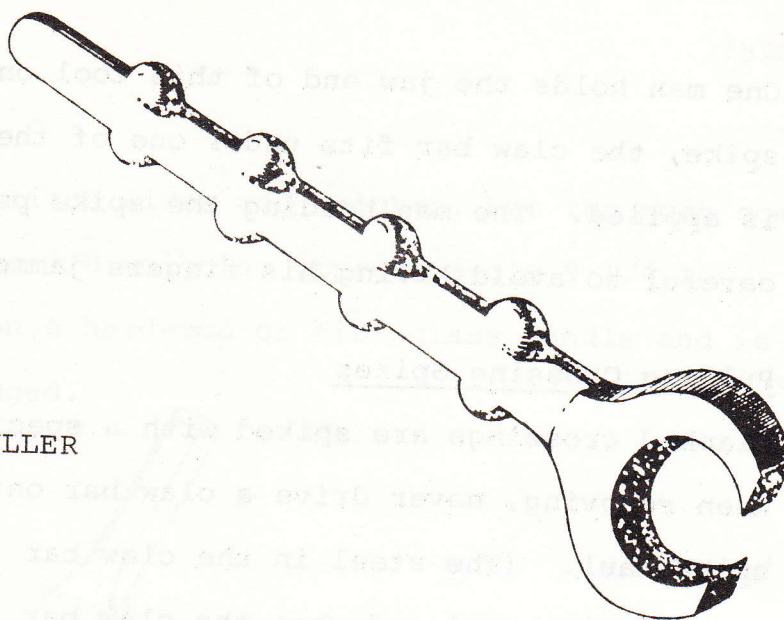
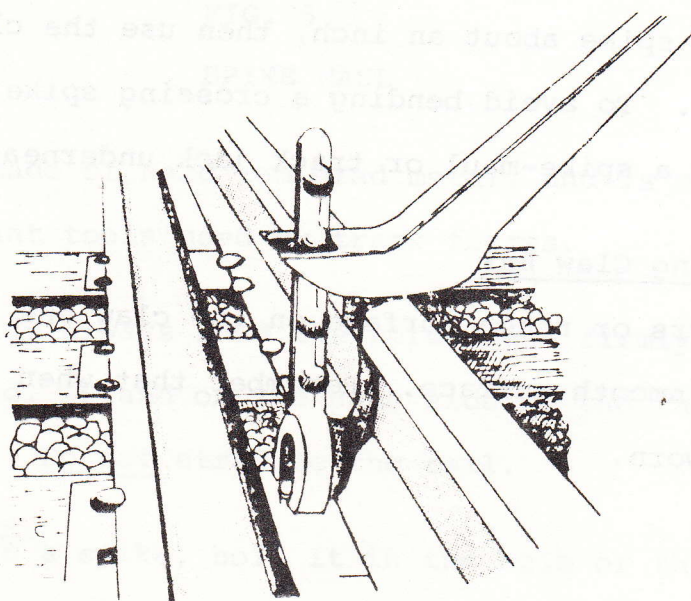


FIG. 3

SPIKE PULLER

There are many slang names for this tool such as a Lady's finger, Bull-dog, Roadmaster, etc.



SPIKE PULLER

USED WITH

CLAW BAR

FIG. 4

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One man holds the jaw end of this tool on the head of the spike, the claw bar fits under one of the knobs and pressure is applied. The man holding the spike puller must be very careful to avoid having his fingers jammed.

#### Pulling Crossing Spikes

Planked crossings are spiked with a special type of spike. When removing, never drive a claw bar onto the spike with a spike-maul. (The steel in the claw bar is softer than that in the spike-maul and when the claw bar is struck, steel pieces could chip-off and fly causing serious injury).

To remove a Crossing Spike, use the pinch bar end of the claw bar to pry underneath the washer. Two men and two claw bars may be needed to start lifting the spike.

Raise the spike about an inch, then use the claw end to remove it. To avoid bending a crossing spike when removing it, place a spike-maul or track jack underneath the claw bar.

#### Maintaining Claw Bar

Metal burrs or rough surface on the claw end should be ground off to a smooth surface. Remember that when grinding, goggles must be worn.



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### 1.3 Spike Maul

There are various sizes and weights, but the most commonly used one is a #10 weighing approximately 9-1/4 lbs. It is mounted on a hardwood or fibreglass handle and is securely wedged.

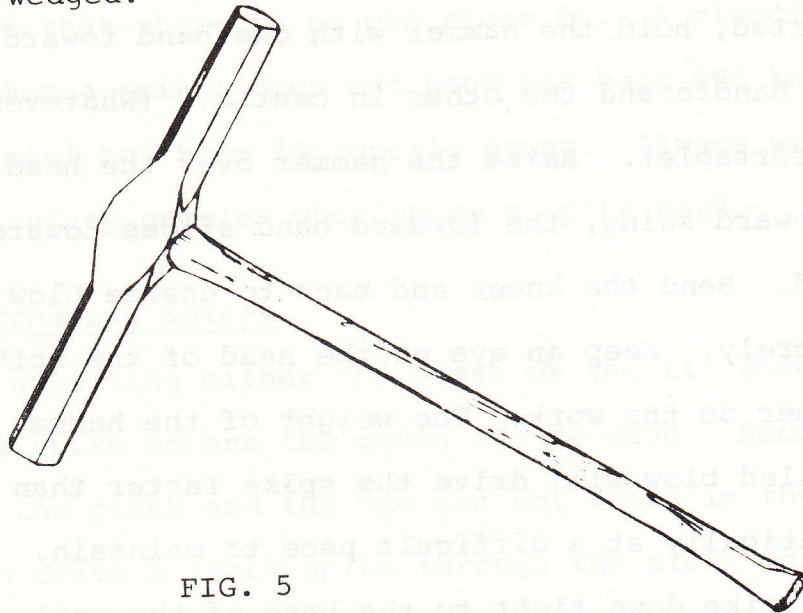


FIG. 5

#### SPIKE MAUL

It is made of hard tempered metal, and is one of the most important tools used by track forces.

To spike, always hold the spike maul firmly to prevent slipping. Stand on the same side of the rail as is being spiked. Do not straddle the rail.

To start a spike, hold it in the hole of the tie plate with one hand with the longer side of the head pointing towards the rail.

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Tap the spike with the maul. Start the spike straight and not at an angle. Without swinging the maul over the head, give the spike several harder blows to be sure it is well set. If not well started the spike may fly up striking the spiker or someone close by. After the spike is properly started, hold the hammer with one hand toward the end of the handle and the other in centre. (Whatever balance is comfortable). Raise the hammer over the head, and on the downward swing, the forward hand slides towards the other hand. Bend the knees and back to ensure blow is struck squarely. Keep an eye on the head of the spike. Let the hammer do the work. The weight of the hammer plus a controlled blow will drive the spike faster than swinging frantically at a difficult pace to maintain. Avoid driving the spike down tight to the base of the rail. Leave a space of  $1/16$ " to  $3/16$ " between the head of the spike and the base of the rail.

Driving the spike too hard can damage it, and striking the rail with the spike maul could cause a rail defect in the future. If the spike bends, remove and straighten it, if possible, and re-start after plugging the hole. Drive it straight down.



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### Safety Precautions

When spiking, work well apart from other workers. This could prevent injury from flying chips and certainly avoids being hit by other spike mauls. Do not swing the spike maul until sure that there is no one close by. A glancing blow happens when a spiker does not bend his back and knees, or when the maul has been improperly swung. Always wear approved safety goggles when using a spike maul.

### Driving Crossing Spikes

To avoid splitting either the plank or the tie underneath, drive the spike across the grain of the wood. Because the grain of the plank and the tie are not lined in the same direction drive a track spike through the plank only, then remove it, and insert a crossing spike in the hole so that the chisel point will be at  $90^{\circ}$  to the grain of the tie. Drill a hole in the plank if a drill is available. The same precautions apply as when driving a track spike.

### Applying Rail Anchors Using a Spike Maul

Rail Anchors grip the rail and fit against the side of the tie to keep the rail from moving. An improperly placed or incorrectly struck rail anchor will fly, possibly striking the man applying it or someone else nearby. Place the anchor under the rail beside the tie with the big end on the inside.

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Be sure the anchor is tight against the tie and straight (90° to base of rail). Strike it with one solid blow at the top of the inside end driving the anchor until the base of rail fits in the notch on the field side. Do not overdrive.

#### Removing Rail Anchors Using a Spike Maul

There is always a danger of a rail anchor flying and injuring someone, therefore, place a foot over one end of the anchor when removing it.

Do not straddle the rail when removing rail anchors. Swing the maul over the rail, striking the end of the anchor to remove it. After anchors have been removed, pile them in a convenient location so that they will not be lost or buried.

#### Installing Tie Plates Using a Spike Maul

To install Single Shoulder tie plates, shove the plate under the rail from the field side of the tie with the shoulder towards the field side. Tap into place by striking the shoulder side of the plate with the maul. Avoid a full swing as the blow is difficult to control.

To install Double Shoulder tie plates, start the plate underneath the rail from the side of the tie by hand. Tap it into place by striking the side of the plate with maul. Remember to control the swing.



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### Removing Tie Plates

To remove single shoulder tie plates, tap out from the gauge side moving the plate along the tie to the field side. To remove double shoulder tie plates, tap out across the tie.

### Maintenance of Spike Mauls

The method of putting a maul head on a wooden handle is known as hanging. The handle is put in the eye of the maul and tapped in snugly with a hammer striking the end of handle. The head must be at right angles to the handle. After the handle has been tapped snugly into the maul, cut off any overflow or excess handle with a hand saw. Next drive metal wedges into the bottom of the handle to secure it. Any handle that is broken or cracked should be changed. A handle that is loose should be rewedged to tighten, or be replaced. Grind any surface of the maul where the metal is burred. See SPC 2100, Appendix B or TS 1803.

Note: Each man gets used to a certain weight and balance of maul. As much as possible, he should mark, use and maintain his own spike maul.

#### 1.4 Sledge Hammer

A sledge hammer has a double faced head and comes in various weights. A 9-1/2 lb. sledge is commonly used. It has a larger striking face than the spike maul and is used with a shorter handle. The head must be hung squarely on the handle, and properly wedged to keep it tight.

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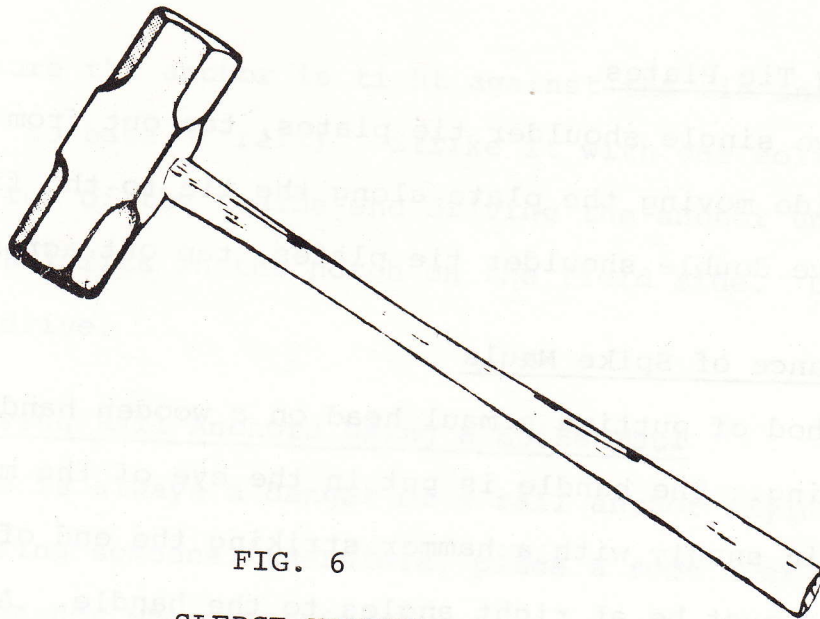


FIG. 6

## SLEDGE HAMMER

Uses

A sledge is used to strike other tools such as a track chisel or a rail drift pin. When using a sledge bend over sufficiently so that a square blow is struck on the object. A glancing blow could cause steel chips to fly. Approved safety goggles must be worn by employees working with a sledge hammer.

Maintenance

Watch for signs of the head mushrooming. Check the handle for signs of cracking, splintering, or looseness. Repair as stated under Spike Maul Maintenance.



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### Track Chisel

A track chisel is used mainly for cutting bolts and rails. The head is about 10" long and weighs 5-1/2 lb. It is used on a handle 18" to 22" long. The cutting edge must be properly dressed and sharpened.

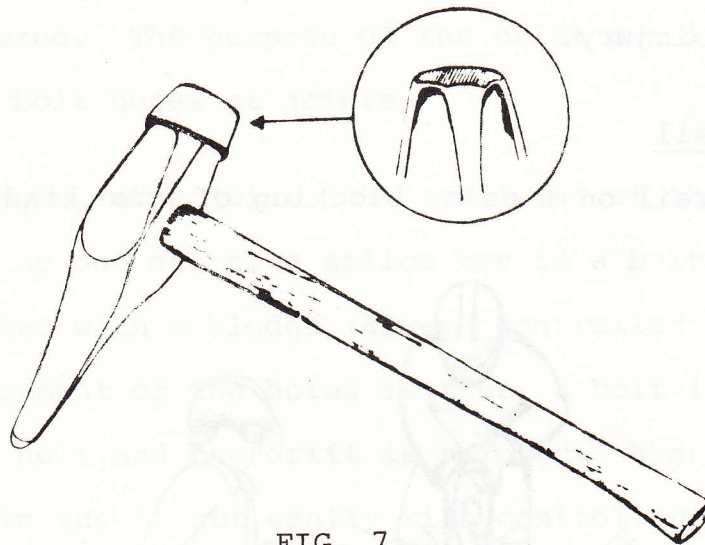


FIG. 7

### TRACK CHISEL

The face of the chisel that is struck with a sledge hammer must have a rubber guard. Usually this is a sleeve made from a 2" section of steam hose.

### Cutting Bolts

Both men, the one holding the chisel and the one using the sledge hammer must wear approved safety goggles. One man holds the chisel with the handle extended with the cutting edge held squarely on the nut to be cut. The position of the

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man with the sledge hammer is in front of, and a little to one side of the man holding the chisel. The hammer blow must be well controlled to hit the chisel squarely. The man with the chisel should have enough time to set the chisel properly in the notch between blows. An improperly set chisel should cause steel chips to fly and cause personal injury.

#### To Cut Rail

Set the rail on ties or blocking of some kind on each end.

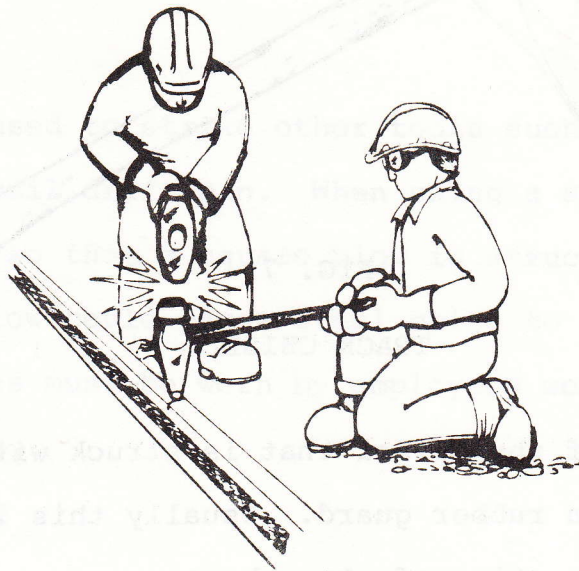


FIG. 8

CUTTING RAIL

Notch one side of the base with the chisel. Turn the rail over and make a small notch on the other side of base directly opposite the first notch. Pry down on each side of where cut is intended with lining bars. As pressure is being applied, place chisel in second notch and strike with sledge hammer to cut rail.



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Maintenance of the Track Chisel

The handle is maintained as for mauls and sledges, and is sharpened as directed by the Foreman. See SPC 2100, Appendix B.

Rail Drift Pin

Rail drifts are steel, circular in shape, 12" to 18" long and tapered. The purpose of the drift pin is primarily to line up bolt holes at joints.

For example, at a joint, the small end of the drift pin is started at one end of a splice bar in a bolt hole and driven in further with a sledge (always controlled blows). When the alignment of the holes is true, a bolt is inserted in another hole and the drift is removed. When removing the drift pin tap it out gently with controlled blows.

A rail drift pin should only be used when authorized by the Track Foreman because circumstances may cause the Foreman to decide to use a rail-expander or solve the problem in another way.

Maintenance

Pieces of metal that may fly when the drift pin is struck should be ground off. Safety goggles must be worn by employees in the immediate vicinity.

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Tie Plug Punch

A tie plug punch or stub punch has an eye size of 3". The head length is 12-1/2", the square end is 1/2", and the round end is approximately 2". The handle for the punch is 18".

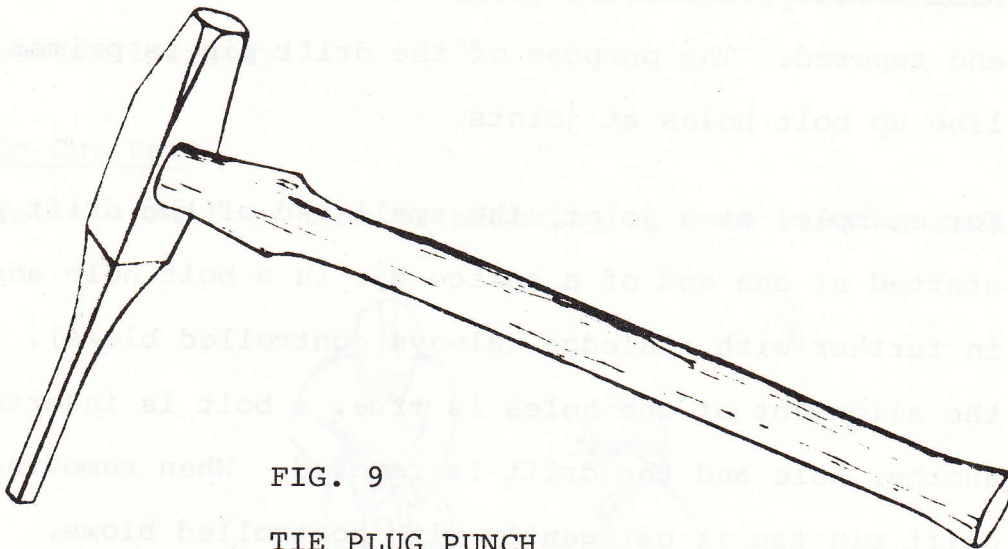


FIG. 9

TIE PLUG PUNCH

It is used to complete the driving down of tie plugs through the tie plates, or to drive down broken spikes in ties. One man holds it in the same manner as the track chisel was held, the small square end resting on the tie plug or spike. It must be struck squarely with the sledge hammer.

The round end should be equipped with a safety rubber sleeve similar to the chisel. Goggles must be worn when using a stub punch. The handle is maintained similar to that of a



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track chisel, and excess metal on either end should be ground off. See SPC 2100, Appendix B.

### 1.5 Track Wrench

Various sizes of track wrenches are required to fit various sizes of nuts. There are also larger wrenches to fit the nuts on guard rail and frog bolts.

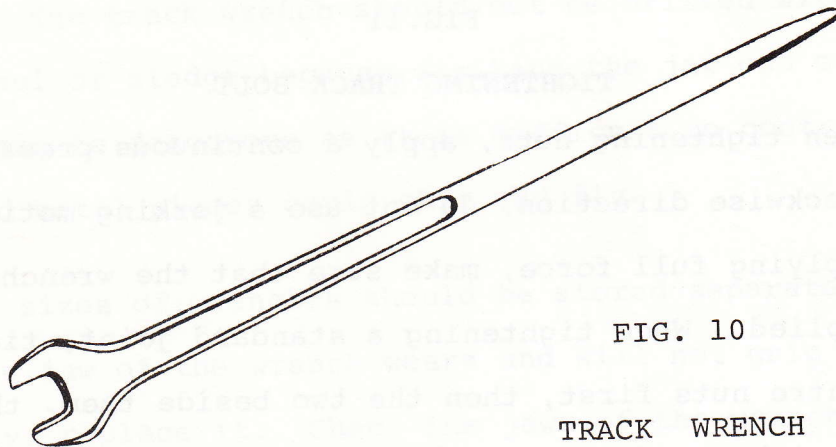


FIG. 10

TRACK WRENCH

#### Use

Track wrenches are used to tighten or remove nuts from bolts. Hold the wrench with one hand on the end of wrench, and the other hand 8 to 10" along the bar. Always stand on the opposite side of the nut being tightened and never straddle the rail. Firmly brace the rear foot so that if the wrench slips you will not fall backward.

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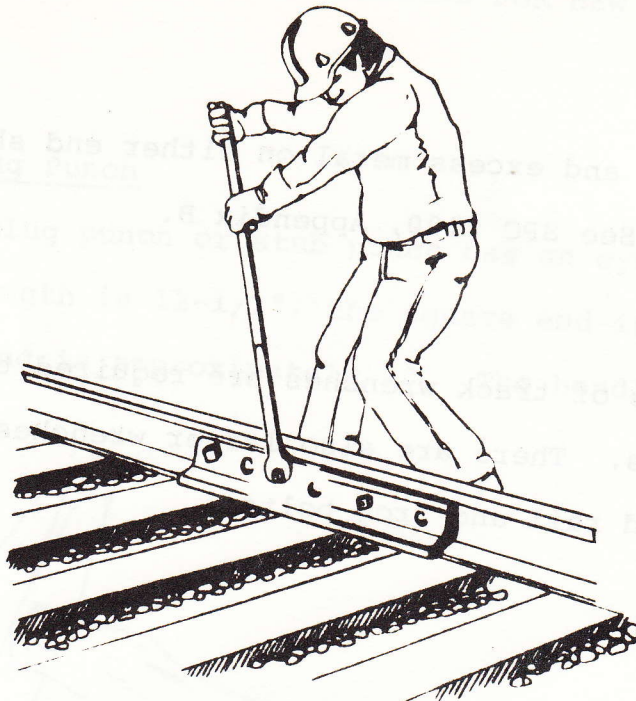


FIG.11

#### TIGHTENING TRACK BOLT

When tightening nuts, apply a continuous pressure in a clockwise direction, do not use a jerking motion. Before applying full force, make sure that the wrench is properly applied. When tightening a standard joint, tighten the centre nuts first, then the two beside them, then the nuts on either end of the splice bar. Nuts should be tightened snugly and broken washers and bolts must be replaced.

"Rattlers" (bolts seized and rattling loose) are commonly found around crossings. If a nut cannot be tightened, it must be cut with the track chisel and replaced.

There are standard torques for tightening nuts used on various rail weight, and a specialized torque wrench is used to measure the tightness. Refer to SPC 3204, Table 3.



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When removing nuts, the same procedures are used except that the turn is counter-clockwise. Always select the proper wrench to fit the nut being tightened or removed. Do not put pipe extensions on track wrenches, and do not drive bolts in or out with a spike maul because it strips the threads.

The pointed end of a track wrench can be used to line up bolt holes if it can be done without driving it in with a hammer. The track wrench should not be drifted with a spike maul or sledge because striking the jaw end of the wrench can be dangerous as it is difficult to control the blow and metal pieces could chip and fly.

Various sizes of wrenches should be stored separately.

When the jaw of the wrench wears and will not grip the nut properly, replace it. Check the jaws of the wrench for chips or cracks.

#### 1.6 Lining Bar

A lining bar is a bar 5' 3" long, weighing 17-1/2 lbs. The big end is tapered to a chisel point of 1-1/4" wide and the small end is ground to a point.

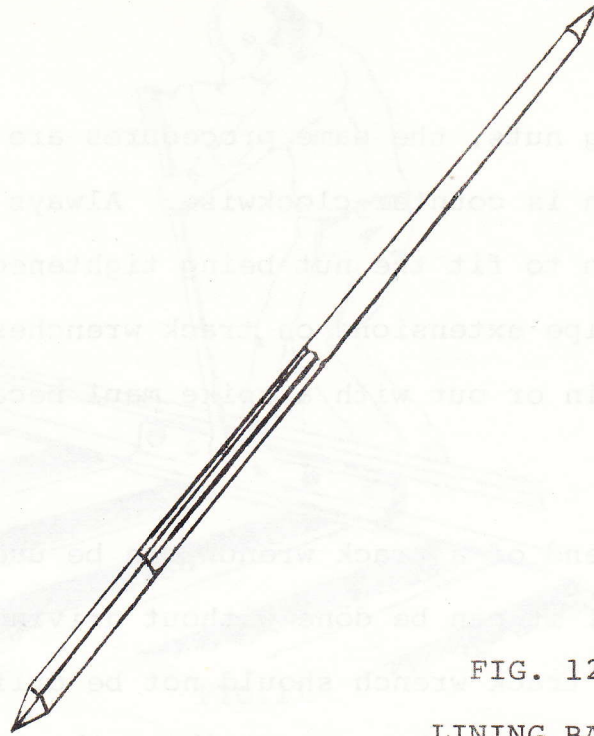


FIG. 12

## LINING BAR

A pinch bar is a bar 4' 9" in length, weighing 18-1/2 lbs. One end is pointed, while the other end is a curved pinch. A lining bar (or pinch bar) is used to line track. Lining can be done with a number of men using bars placed under the rail and pulling together. Hold the bar to one side, and stand facing the direction the track is to be lined. The bar is placed under the rail, big end down if using a lining bar or pointed end down if using a pinch bar, at approximately a 60° angle with a firm bite in the ballast so that the bar will not slip. If the angle is too small, the rail will be lifted and not pushed. Have a firm footing and ensure that the bar has a good hold in the ballast. Do not straddle the lining bar. If the bar slips, a possible injury could result.



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When pulling, keep the back as straight as possible, bend the knees to get power from the legs. It is important when lining, that everyone pull at the same time. For this reason one man is appointed to give signals.

If the track is difficult to line in a spot, loosen the ballast with the bar at the end of the ties to be lined.

Track can be lined with a varying number of men depending on the type of ballast, the thickness of the shoulder, etc.

When walking from spot to spot, walk well clear of the rail as the Foreman is sighting the rail for the next throw.

When carrying the lining bar, carry it pointed end downward and to the side. When using the lining bar to move a rail, slide the bar on an angle under the base of the rail.

Lifting the bar will cause the rail to slide.

When moving a rail to gauge, remove a tie plate and drive the bar into the tie at the base of rail. Push and hold in position for gauging. Be sure that the bar has a good hold and does not slip.

When removing ties from the tie bed, remove the ballast from one end of the tie and place the bar underneath the centre of the tie to raise it slightly. Using two bars,

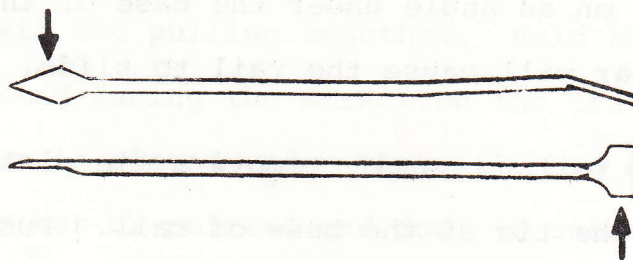
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one at each rail, force the tie out by driving bars into tie and prying against the rail. A tie can be started by driving the bar into the old spike holes. Use the pointed end of the bar and keep it sharp. The bar should be sharpened only under the direction and supervision of the Foreman.

### 1.7 Tamping Bars

A tamping bar is approximated 5' 4-3/4" in total length and weighs 12-3/4" lbs. The diameter of the centre of the bar is 7/8", and one end is spoon shape, while the other is square.

SPEAR END



TAMPING END

FIG.13

### TAMPING BAR

Tamping bars are used to tamp ballast under the ties. Hold the tamping bar so that the spoon-shaped end is down. (If the space under tie is large the square end will be used to tamp).



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Stand approximately 1 tie crib behind the tie being tamped. Dig out the area to be tamped by prying against the rail, pushing the ballast aside. Dig out the ballast so that the bottom of the tie can be seen.

Hold the tamping bar on a slight angle so that the ballast can be driven under the tie.

The tie is tamped with a striking motion and a steady pace is developed to allow tamping to be done over a sustained period of time. It is important that ballast be driven underneath the tie. If it is not, hard work is done but little is accomplished, as the tie goes back down after the first train.

Track ties should be tamped approximately 16" on each side of the rail as well as underneath the rail. Track ties are not tamped in the centre because the area under the rails takes the load and will go down while the centre stays up. When the centre stays up, this is referred to as centre-bound track. It causes damage to the ties and gives a rough-ride.

Turnout ties are tamped the full length so that the surface of the ties under the rail is uniform. Both sides of the tie are tamped at the same time.

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The spoon end of a tamping bar wears out first, and when this happens, get a new one.

### 1.8 Track Jacks

Track jacks come in several sizes and capacities. Track jacks are made of steel or aluminum.

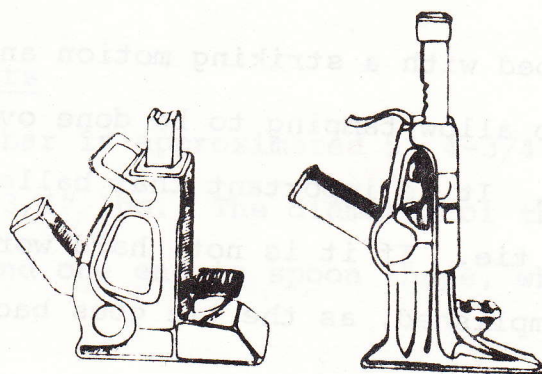


FIG.14

### TRACK JACKS

They are used to lift the track during surfacing operations. They are also used to jack up other heavy objects, and in lining the track.

When placing a jack under the rail, the foot of the jack is installed under the base of the rail. If there is too much ballast for the jack to fit, a suitable hole must be dug.

The jack must always be installed straight. If it is not, it could push the track out of alignment.



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A track jack should always be installed on the field side unless the track is protected.

Track jacks should be pumped with a standard square ended jack bar. If pumping a jack with a pinch bar (or lining bar) use the pinch (or square end) of the bar in the socket. The bar should never be left in the socket when the jack is not in use.

When raising the jack, stand on the same side of the rail as the jack, with both feet on one side of the bar. Apply pressure quickly using your bodyweight to hold until the jack notches. A constant continuous pressure makes pumping more difficult. Be careful that the bar does not slip. It could cause very serious injury. If a spot is too heavy to lift, do not struggle, get help.

In some areas it is advisable to have two men pumping a jack. For example, the frog and lead area of a turnout. Here two men pump together, one on each side of the bar.

When dropping the jack, let other workmen know, and be sure everyone is clear. Hold the pin on the lower pawl so that it engages the notch in the underside of the upper pawl.

Bar the socket down to drop the jack.

To shake a jack, put a bar in the socket and shake in a motion parallel to the rail. The jack will loosen and then drop.

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In some cases it may be necessary to lower the jack slowly one notch at a time. This operation should have two men, one working the bar and socket, the other working the pin to put the pawl in each notch. Always drop a jack as described unless instructed by the Foreman to do otherwise. The jacking of other heavy objects should only be done under the direction and supervision of the Foreman.

When using the track jack to line track, dig a hole in the ballast between two rails, approximately the length of the jack, from the rail on the side in the direction track is to be shifted. The hole should be deep enough so that when the base of the jack is put in the hole, the top of the jack fits up against the web of the rail.

Brace the base of the jack by driving a bar deep into the ballast directly behind the base of jack and apply pressure. Two men pump the jack, one on each side of the bar. When the track is shifted the required amount drop, or shake the jack, depending on Foreman's instruction. Be careful, as this method of lining tends to lift the track as well as shift it. It should not be done except under the direction of the Foreman.

Any defective jack should be reported to the Foreman who will have it repaired or replaced. The mechanism of a jack



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should be kept free of grit and stones and oiled as required. A jack with a weak, broken, or worn mechanism should not be used. Avoid getting hands caught in any of the moving parts when using or maintaining a jack.

There is a special jack used to line track. It is called a Sinning Liner.

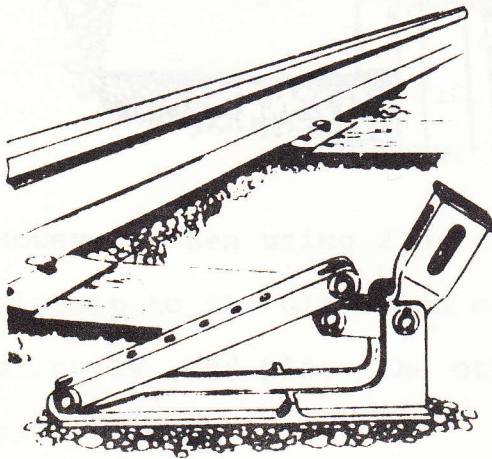


FIG. 15

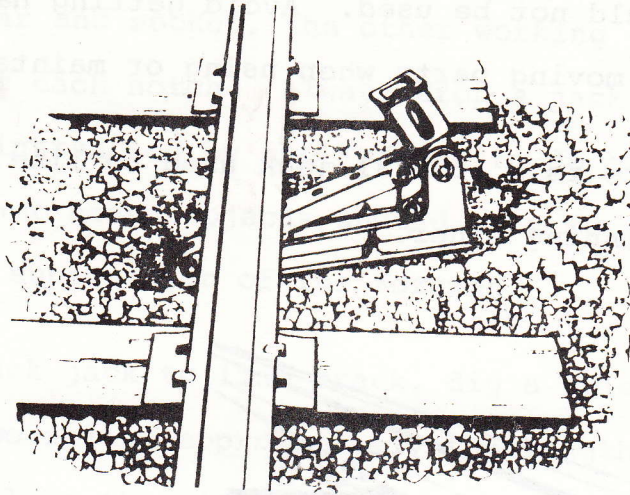
SINNING LINER

It is used to shift the track and put it in proper alignment. The base of the jack fits under the base of the rail on a slightly downward angle, to minimize the lifting of the track being shifted.

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FIG.16

LINER PROPERLY POSITIONED



It may be necessary at some spots to remove some ballast from underneath the base of the rail in order for the liner to be placed properly.

The liner should be pumped with a square-ended lining bar. The procedures concerning bars and the socket are similar to those given under track jacks. The liner is pumped in a similar manner to a track jack except that the stroke is shorter and quicker.

As the track moves, the sinning liner must be pushed ahead so that it fits properly. A great deal of track can be lined this way.



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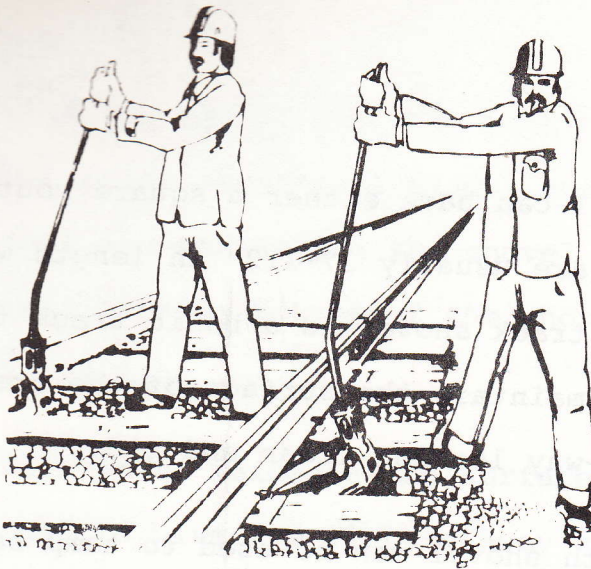


FIG.17

## READY TO LINE

However, when using 2 or 3 liners, place one on the rail closest to the direction of lining, allowing it to lift slightly, and place the other 1 or 2 liners on the other rail to push.

When the track is difficult to move, loosen the ballast at the ends of the ties with a bar or pick, or, start the spot to be lined with a track jack as described previously. As with track jacks the gear mechanism of the Sinning Liner should be kept free of grit and stone, and oiled as required. A defective lining jack should be reported to the Foreman.

When using a lining jack, be careful not to get fingers caught in the moving parts.

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### 1.10 Track Shovel

A track shovel can have either a square mouth or a round mouth. They are usually 37-1/2" in length with a D or Y handle. The track shovel is a basic track tool used almost every day to maintain the surface of the track and to keep the right-of-way looking clean and tidy.

A square mouth shovel can be used to tamp ballast under the ties. The procedure is similar to the description given under "Tamping Bars".

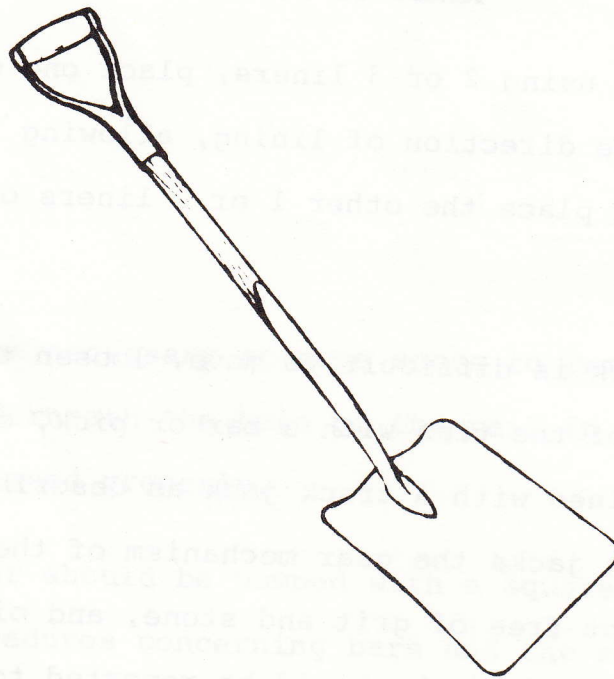


FIG.18

TRACK SHOVEL

It is important to move the ballast away from the spot to be tamped to determine that the ballast is going underneath the tie. Dig to the bottom of the tie.



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To tamp, hold the shovel end with both hands, balance one foot on top of the shovel blade, and apply pressure with the foot, co-ordinating the shovel motion with the hands. Use a jerking motion of the shovel to force ballast underneath the tie.

Track is trimmed to maintain the surface and alignment of the track and to give the right-of-way a neat appearance. Trimming is more than just filling in a hole with ballast. It helps to maintain the surface and the line of the track. Always shovel ballast from the bottom of the shoulder, or the berm, upwards to create a rounded shoulder. Do not mix the berm, etc. with ballast or the ballast will become fouled and given poor drainage.

A ballast fork is an effective tool for trimming track.

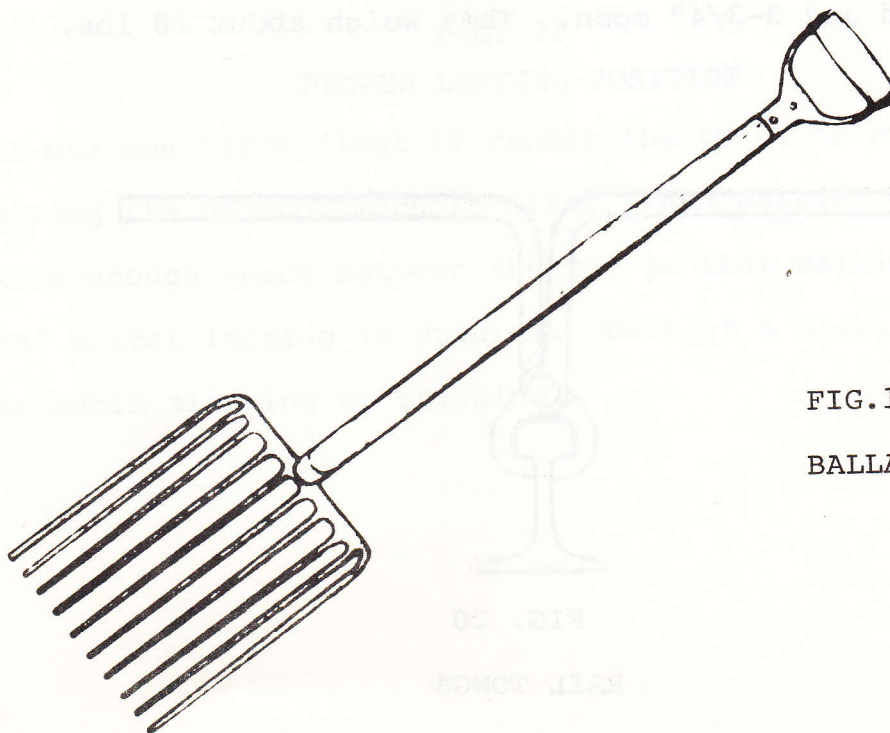


FIG.19

BALLAST FORK

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It is easier not to get other materials mixed with the ballast if trimming is done with a ballast fork.

On double-track, a fork is good for trimming the field side, not the 8' between the tracks which is commonly called the Devil's strip.

During surfacing operations, the trimming can be done with a track shovel or the ballast fork at the discretion of the Foreman.

Look for cracks and slivers on the wooden handle of the ballast fork. These might lead to it breaking under use. Report any damage to your Foreman.

#### 1.11 Rail Tongs

Rail tongs are 25-1/4" in length with jaw openings of 7/8" closed and 3-3/4" open. They weigh about 18 lbs.

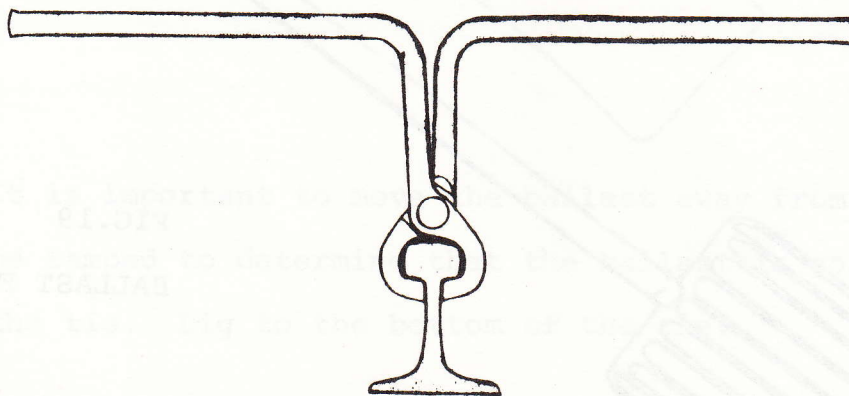


FIG. 20

RAIL TONGS



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They are used for moving rails with 2 men working together per tong. The jaw tightens underneath the ball of the rail when it is lifted. When lifting, bend the knees and lift together using the legs. The back should be straight, and the handle of the tongs on each side of the rail at the same height. It is good practice to have men of approximately the same height paired, to equalize the lift.

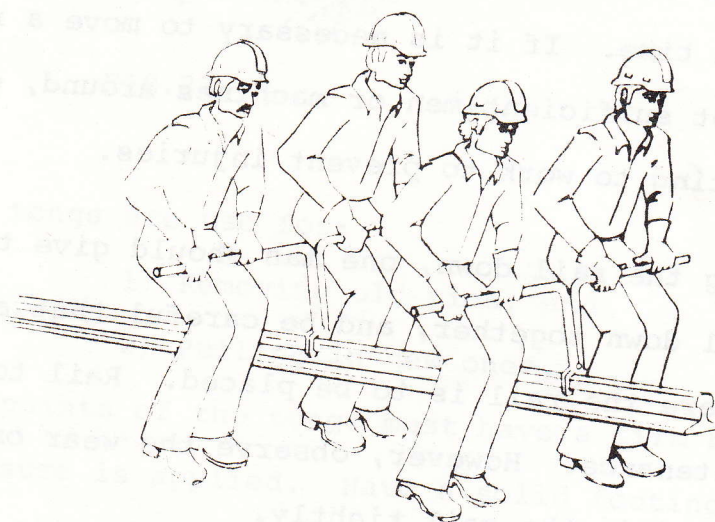


FIG. 21

## PROPER LIFTING POSITION

If one man lifts first it causes the tongs to angle downward giving the partner more to lift. When walking with a rail, keep enough space between the men so that walking is easier, and better footing is ensured. Walk at a slow, steady pace to avoid slipping or tripping.

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When sliding a rail, place the rail across the two rails of the track. The men on the tongs should spread out along the rail to give ample space for pulling on the tongs. Pull on the tongs to slide the rail along the track. Always look for good footing and move slowly.

The number of men required varies with the length and the weight of the rail. If you do not have enough men, move one end at a time. If it is necessary to move a rail and there are not sufficient men or machines around, get help, before starting to work to prevent injuries.

When setting the rail down, one man should give the signal. Set the rail down together, and be careful that all feet are clear of where the rail is to be placed. Rail tongs require little maintenance. However, observe the wear on the jaws, as they must grip the rail tightly.

#### 1.12 Tie Tongs

Tie tongs are approximately 24" long, with handles on one end, and conically shaped, hardened steel points on the other for biting into a tie.



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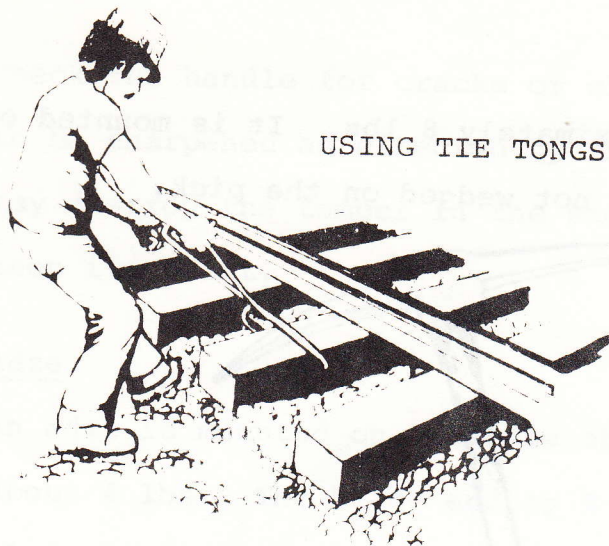


FIG.22

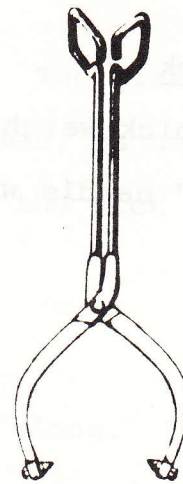


FIG.23

Tie tongs are use for:

- 1) Removing old ties; and
- 2) Pulling in new ones.

The points of the tongs must have a firm bite in tie before pressure is applied. Have a solid footing to avoid stumbling or falling backward. When two men are on a pair of tongs, each man must have a good hold. One man pulls on each handle.

Ties can be carried by a similar tool (with a wooden yoke) commonly called "luggers". The wooden handle enables a man to lift on each side of the tie. The points on tie tongs must be kept sharp so that they will bite into the wood. Check for wear on the pivot and keep it oiled.

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1.13 Pick

A pick weighs approximately 8 lbs. It is mounted on a 36" handle which is not wedged on the pick.

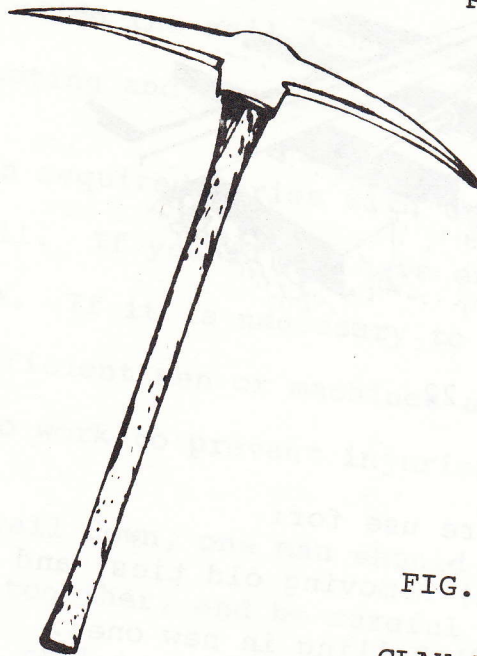


FIG. 24

## CLAY PICK

It is used for loosening ballast, clay, dirt, ice, etc. It is not swung like a spike maul. A shorter swing is required with feet firmly planted. Always warn persons nearby to stand clear. When breaking ice, a short controlled swing is required. Be careful of flying pieces and protect your eyes by wearing safety goggles.

When loosening ground or ballast, use short swings, as stones or other material will fly around. When being transported on the motor car, the pick and its handle should be separated and placed side by side in the tool tray.



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Check the handle for cracks or slivers. The pick is to be sharpened as directed by the Foreman, as sharpening may destroy the temper in the steel and the pick will not keep its point.

#### 1.14 Adze

An adze is mounted on a handle about 36" long. It weighs about 4 lbs. The blade end is 9-7/8" long, and the cutting blade is 4-3/4" wide.

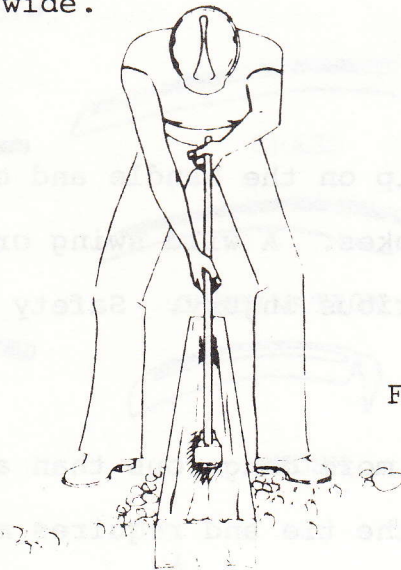


FIG.25

FEET PLACED PROPERLY

It is used for removing wood from ties, planks, etc. When using the adze, stand with one foot on each side of the object being adzed, keep feet well apart, and make sure that the tie or plank is secured so that it will not move.

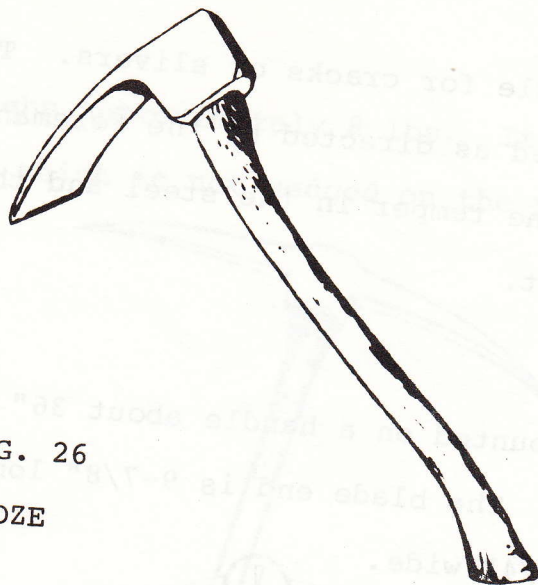


FIG. 26

ADZE

Keep a firm grip on the handle and cut with short, sharp, controlled strokes. A wild swing or a glancing blow could result in a serious injury. Safety goggles are to be worn when adzing.

A dull adze is more dangerous than a sharp one, as it tends to bounce off the tie and requires more effort to use it. An adze is sharpened on the top side only. The bottom edge (face that comes next to the wood) must be left flat. If both sides are sharpened, the adze will jump or deflect. Make sure the handle is free of splinters or cracks and is securely wedged on the adze.



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### 1.15 Scythe

A scythe consists of a blade attached to a wooden or aluminum handle called a SNATH. There are 3 types of blades:

- 1) A brush Scythe - short blade;
- 2) A combination Scythe - Medium blade; and
- 3) A grass Scythe - Long blade.

The difference is in the size of the blades, which are inter-changeable.

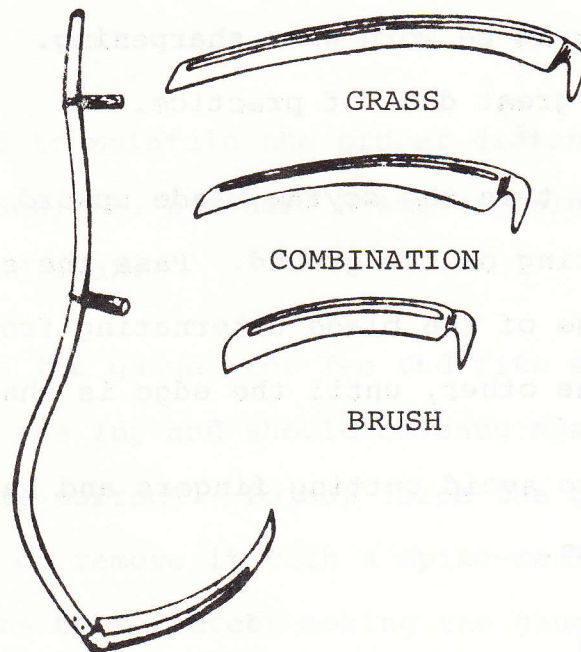


FIG. 27

SCYTHE

When cutting grass, the men must be well spaced and not working too close together. The width of the cut of one swing is known as a swath.

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When swinging, remember that the scythe is not swung freely, but with a pulling motion. Keep the point down.

When cutting brush, the swing is a similar pulling motion with a springing upward cut. Always cut with the part of the blade closest to the handle. Protect your eyes from springing branches, and watch your footing. Keep the men spaced well apart.

A scythe requires constant sharpening with a scythe stone. Goggles should be worn when sharpening. Sharpening by hand requires a great deal of practice.

To sharpen, turn the scythe blade upward with the wooden handle resting on the ground. Pass the stone along the cutting edge of the blade alternating from one side of the blade to the other, until the edge is sharp.

Take care to avoid cutting fingers and hands when sharpening with a stone.

#### 1.16 Track Gauge

A track gauge is made from a heavy gauge piece of pipe with a lug end and a tee end. It can be insulated or non-insulated.



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FIG. 28

## TRACK GAUGE

It is used to maintain the proper distance between rails in the track, the standard distance being 56-1/2" (3' 6" in Newfoundland).

When using the gauge, the Tee end fits snugly against one rail, and the lug end should be snug against the other rail if gauge is correct. Do not force the gauge down when checking, or remove it with a spike-maul, because the pipe can be bent thereby making the gauge inaccurate. When gauging, every 3rd or 4th tie is spiked to gauge.

The track gauge should be tested and maintained by the Foreman. If the gauge is thought to be loose or inaccurate, or the insulation faulty, report it to the Foreman.

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### 1.17 Level Board

A level board is a wooden board approximately 7' long, 7" wide, and with a white strip in the centre - 4-1/2" from the bottom, (See plan S2P-1.34)

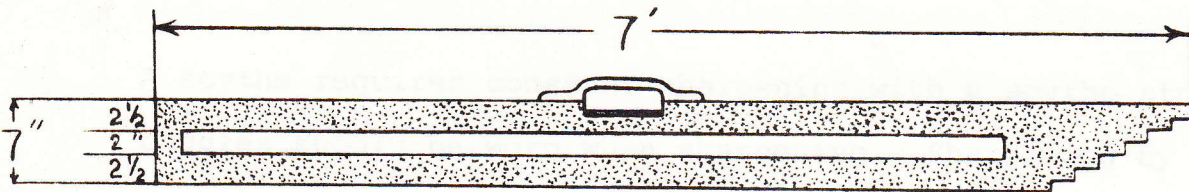


FIG. 29

### LEVEL BOARD

of the board to the top of the white strip. There is a bubble in the centre, as in a carpenter's level. It is used for measuring the cross-level of the track.

It should not be struck or thrown, nor should it have tools piled on top of it on the motor car. Report any damage to the board to the Foreman. The Track Foreman will check and adjust the level board when required.



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1.18 Rail Fork

The rail fork is used to turn or roll a rail.

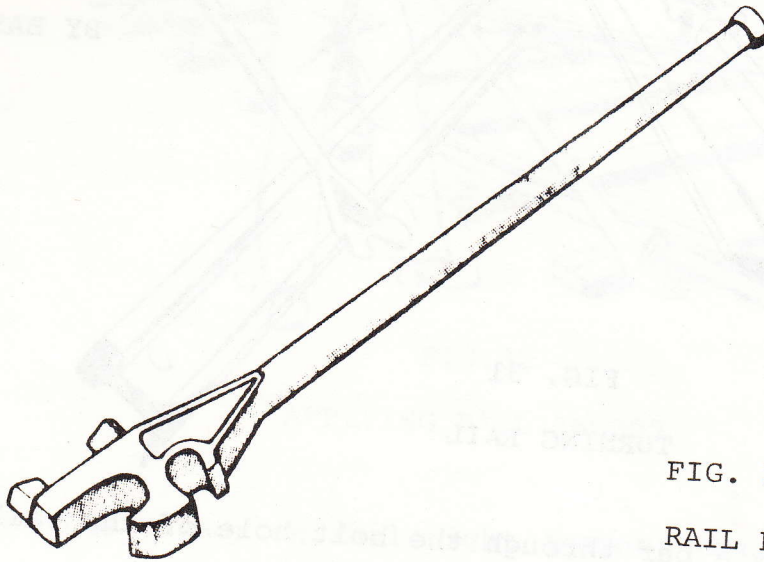
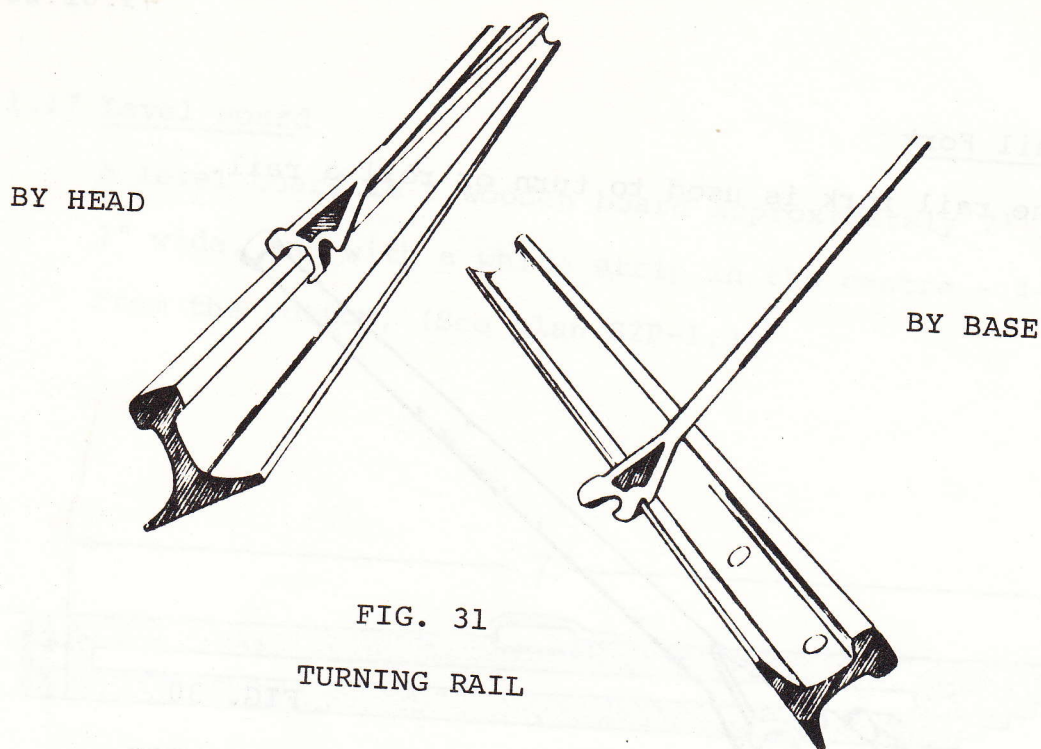


FIG. 30

RAIL FORK

It is designed so that it can be applied to the rail in several positions as the rail is turned or rolled. The rail fork will release automatically as the rail flops over. The rail is always rolled away from the person or persons turning the rail so that if the rail should suddenly snap over it will not roll on their feet or legs.



Sticking a bar through the bolt hole of the rail to turn it is prohibited. If a rail is suddenly flipped over, the bar would not release from the bolt hole and could strike the person using the bar.

#### 1.19 Woodings Rail Anchor Applicator

This rail anchor applicator is used only to apply Woodings type rail anchors.



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FIG.32

## APPLYING RAIL ANCHOR

Hang the anchor on rail tight against the tie, then anchor with its applicator. Pull with a short snap to apply the anchor.

1.20 Trowel

A trowel is used to hand surface track.

Dig out the tie ends.

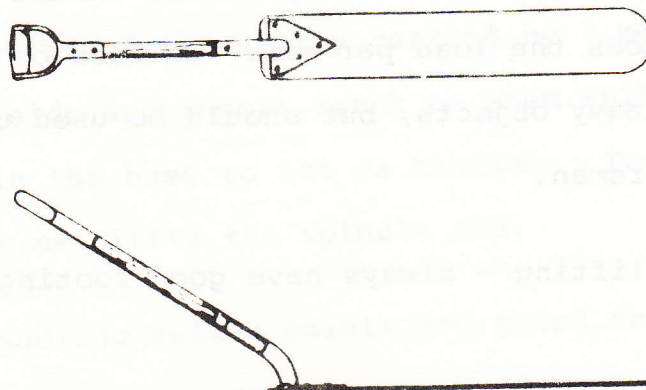


FIG.33

## TROWEL

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Raise the track with a track jack the required amount. Place the necessary amount of fine material on the blade and insert blade for its full length under the tie. Withdraw the trowel with a quick movement so that the material will be left behind. Do not throw material in as it will be under the centre of the tie and could cause centre bound track.

## 2. SAFE LIFTING AND HANDLING

2.1 When lifting heavy objects, always lift with the strain on the legs and not the back. Back injuries are easy to get and it is not always a heavy lift that will cause it. Kegs and containers containing spikes or bolts, or drums of oil, should be rolled as much as possible and lifted only when necessary.

Heavy objects should not be lifted by one man (even if he is able) because injuries can be easily obtained. On any heavy lift, as many men as possible should be involved. This reduces the load per man. Rollers or skids are useful to move heavy objects, but should be used under the direction of the Foreman.

Whenever lifting - always have good footing, and always lift together.



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## 2.2 Loading Ties on Push Car

When lifting ties with two men per tie, one man lifts his end first and cants the tie slightly making it easier for his partner to get a good hold. When both have a good hold they should lift together. Always be alert and careful to avoid pinching fingers or dropping the tie on a foot.

When piling ties, pile them in tiers that run in opposite directions. When the pile is several tiers high a 3rd man may be required to lift it to the required height.

When using a push car, the load of ties will vary with the distance to be transported, the power to pull load, etc.

- 2.3 When piling ties on the ground, they should be piled in tiers as described in piling ties on a Push Car. Ties should be piled in a convenient place and not underneath communication or similar lines. The size of the pile is determined by the Foreman.

A switch stand is usually carried by 3 men. Turn the stand on its side and insert track or shim spikes through the spike - holes in the base to act as handles. Two men lift here and another man lifts the spindle end.

When handling switch points and guard rails, at least 2 pair of rail tongs are used to carry (except 22 and 39' points where more may be required). Be sure the tongs are secure.

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When moving a frog it should be pushed with lining bars and skidded under the supervision of the Foreman. When lifting a frog, either mechanically or manually, there should be an experienced Foreman giving the instructions.

### 3. PLACING TOOLS ON A MOTOR CAR

Trays for placing tools are on the sides of Motor cars. Longer tools such as claw bars, lining bars, etc. should be placed at the bottom of the tray with smaller tools on top. Pointed tools - bars, picks, etc. should be placed so that the pointed ends do not stick out in any way. They should be placed so they do not cause injuries to men getting on or off the Motor Car.

A pick head and handle should be separated when being carried on the Motor Car. Tools should not be placed in trays in a careless fashion where they may fall off the Motor Car. Tools are not to be placed or carried on the seating area.

#### 3.1 Placing Track Motor Car on, and Removing From the Track Putting it on

Release the brake, and remove wheel blocks.

Push the car from the set-off onto the plank of the center-track set-off until wheels are almost at the furthest rail.

Extend the lifting handles to the rear.

Lift and turn the car to set it on rails.



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At the same time as lifting, one man puts his weight on the front end, usually by standing with one foot on the bar at the front.

This makes it easier to lift and turn the car.

#### Taking it off

When car is stopped, extend the lifting handles to the rear. One man in front, puts his weight on the car as it is being turned. Others lift and turn the car. Everybody pushes car onto the set-off. Set the brake and block or lock the wheels.

#### Emergency Removal

At a set-off location, the same procedures apply.

If not at a set-off, extend the handles, then lift and turn the car, push it back and lift it over the rail, pushing it into clear.

In an emergency situation, remove the car only if there is time. In all cases the safety of the men is more important than saving the Motor Car. When clear of the track, move towards the approaching train.

Trains are usually expected as they appear on the line up, whereas Motor Cars are not. Keep a close watch for other Motor Cars.

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### 3.2 Seating and Responsibilities

The maximum seating on most track Motor Cars is 6 persons. Everyone must be seated and no one may stand up while the Motor Car is moving. In curves, where the distance one can see ahead is short, speed must be reduced. Always be able to stop in half the distance which can be seen.

The man seated at the front of the car should watch ahead.

The man seated at the rear of the car should watch behind.

Everyone riding on the Motor Car should:

- 1) Be on the look-out for trains or other track units at all times.
- 2) Be looking and listening for track problems to the extent of their ability and experience.
  - . The sound can indicate broken rails, surface problems, etc.
  - . The ride can detect surface - line - gauge problems.
  - . Watch for track conditions, fencing, brush on the right of way, etc. (Watch for traffic and people at public road crossings).

In the case of an emergency removal, everyone must know their role and react quickly. The man at the front of the car goes to the front to be ready to push. The man at the rear of Motor Car goes to the rear to lift, turn and remove the car.



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### 3.3 Starting a Motor Car

The carburetor needle should be properly adjusted, and opened approximately 1-1/2 turns. After working with the same motor car a number of times, the carburetor needle does not have to be continually adjusted. Turn on the ignition switch. Retard the spark (timing lever). (On some motor cars, the retarded position of the spark is forward, on others it is back).

The gas feed lever (throttle) should be slightly advanced before starting.

#### Cranking

Insert the crank. Always hold the crank with the thumb and fingers on the same side of the crank handle, otherwise a back-fire could cause a broken wrist.

Turn the crank in a clockwise direction until a buzz is heard. After hearing the buzzing noise, turn the crank quickly in a clockwise direction. If it does not fire, repeat the same procedure. After the car starts, remove the crank, release the brake and gradually increase the throttle and tighten the drive belt.

#### To Reverse

Stop the car, apply the brake and turn off the ignition switch. Just as the engine is about to die, turn on the ignition

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switch and reverse timer lever (Spark). Gradually open the throttle and tighten the belt.

### Electric Start

Newer Motor Cars are no longer belt driven. However, a great many belt driven cars remain in service. These newer cars have an electric starter and the cranking procedure is no longer required.

## 3.5 Servicing a Track Motor Car

Fueling of a Motor Car - Gasoline and oil mixture is as instructed by the Foreman (usually 2-1/2 pints oil per 5 gallons gasoline). The Motor Car is usually fueled in the morning when the engine is cold, and outside of the tool house. The men should keep the Motor Car fueled without repeated instructions from the Foreman. Smoking is prohibited when fueling the Motor Car, or when in the Gas House. Gasoline and oil are stored in the Gas House.

### Wheels

If a wheel is defective or damaged, report it to the Foreman.

## 4. USE OF A LINE-UP

### 4.1 Reading Line-Up

At most locations, the line-up is recorded in the morning before going to work. (Some locations there is an afternoon



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line-up as well). It can be taken by radio, telephone or dispatcher's phone and must be read aloud to everyone travelling on the car.

The purpose of the line-up is to provide information on train times and have it recorded on a standard form. It serves as a guide to track forces, to determine when they can run on the track in safety, and when there is time to do certain work, etc. Remember, line-up of trains is only a Guide. Track forces should be constantly alert for unexpected traffic.

#### Importance of the Engine Number

The information given on line-up includes the engine number of the train, the train number if applicable, the direction travelling, and the time (ordered and/or leaving) a designated station.

It is very important that the correct information be recorded. The engine number should be copied correctly and observed and noted as each particular train passes. Also note whether or not the engine has a white flag at the front (meaning an extra train) or green flags meaning that there are following train sections running on the same timetable schedule.

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Every trackman is to note the engine number and the signals of every passing train and check it with the Foreman, and the line-up. It is very important that all information on trains be correct as life and limb depend on it. Always check the rear of a train for markers.

#### Repeating Line-Up

The dispatcher gives the line-up to the Foreman, who copies it in writing. The Foreman repeats the line-up back to the dispatcher to be sure that it was copied correctly. The Foreman then reads the line-up aloud to his men.

If there is any part of the line-up that is not fully understood, question the Foreman. As everyone's safety is involved, it is important that the line-up be understood by each member of the work crew.

Remind the Foreman when a train is due if it appears that the Foreman is pre-occupied; question him if in doubt. The Foreman should encourage the active participation of all his men in line-up and train information.

#### 4.2 Using the Line-Up

All track people should become familiar with the timetable information for their particular subdivision, which includes train speeds, mileage and locations. Always use the maximum



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speed given in the timetable when figuring out how long it will take a train on the line-up to reach a particular location.

Always read the "Special Instructions" when a new timetable is issued.

#### Computing the Arrival Time

If the line up says that a train is leaving a location 60 miles away at 0900, and the timetable says that the maximum train speed is 60 mph, the train could arrive at 1000.

Everything should be clear and safe for the train to go by no later than 10 minutes to 1000 or 0950 in this example.

If the train does not arrive as figured, wait for it. Find out where it is, take no chances.

A line-up should be destroyed when it becomes void except in the case of an accident or irregularity. This eliminates having several line-ups on hand and making an error by using the wrong one.

The Foreman and his men should obtain information on trains whenever possible.

#### 5. PASSING TRAINS

When doing any work on the track, as soon as the headlight of a train is observed, stand well clear of the track. Warn all the workers to do the same.

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If working in an area where there is more than one track, stand clear of all the tracks.

All tools and equipment must be well clear of the track when a train goes by. Any time a piece of equipment may foul a track, advise the Foreman. If near a switch, stand at least 20' from the switch stand.

There should be men on both sides of the track to observe the train as it goes by. To observe the train, always look in the direction from which the train is coming. There is a tendency especially in the winter, when a passing train causes a cold wind, to look away. This could be fatal ! In the winter, be especially careful of flying pieces of ice.

To inspect a passing train, look for the following:

- 1) The engine number, so that the train can be identified if a defect is observed.
- 2) Smoke around the wheels could indicate a "Hot Box" or a Burnt Journal. This condition often causes a derailment.
- 3) Anything dragging such as chains, metal strapping, etc.
- 4) Shifting loads.

If any defect is observed, report it to the Foreman. If the Foreman is not available, stop the train.

#### References

7355-E Rule 125

U.C.O.R. Rule 111



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6. SAFETY

6.1 If a condition is recognized as unsafe, report it to the Foreman as soon as possible.

6.2 Visible Rail Defects

Employees should watch for breaks in the rail or frog, chipped switch points, chipped joints, broken or cracked splice bars, bolts, etc. A dark streak on the running surface of the rail or bleeding under the head of rail could indicate a serious rail defect. If any of the signs are found, report them to the Foreman immediately.

6.3 Unsatisfactory Surface Conditions

Good Surface

Both rails should have a smooth top, ideally like a table top, and this, of course, will produce a good ride. Poor surface on the other hand produces a rough ride. This is common in joint areas which are weaker under load than the rest of the rail. In many areas, poor surface can be caused by poor ballast, poor roadbed, etc.

Cross Level

On straight or tangent track, both rails should be at the same height from sub-grade, that is, the top of one rail should be level with the top of the other rail. In curves, the outside rail may be higher than the inside rail, to compensate for speed, and this is called superelevation.

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The cross level is determined by the Foreman with the level board as discussed previously. Always advise the Foreman of any irregular surface conditions. Ask the Foreman for the cause, how serious it can be and what can be done about it.

Pay particular attention to the weight or seriousness the Foreman places on specific surface conditions.

#### 6.4 Alignment

When checking alignment, sight down the centre of the ball of the rail. The rail should be perfectly straight or, if in a curve, it should be circular. Sharp, short changes in alignment will cause a rough ride, as will bulges in curves. If these conditions are seen, report them to the Foreman. Ask the Foreman for a possible cause.

#### 6.5 Unstable Grade Condition

The subgrade is the foundation on which the track and ballast are supported. It may be any excavation in natural ground (cut) or above natural ground on a constructed embankment (fill). Keep a lookout for the subgrade shoulder slipping on a fill, the track going down when a train passes, or for a long sag in the surface.

Report these conditions to the Foreman.



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#### 6.6 Unsatisfactory Drainage Conditions

Water is an enemy of the track and roadbed, therefore every effort should be made to keep it free of water.

The land should be sloped and ditches dug to drain it off. Watch for a build-up of water in a switch area, as this is a common problem. Muddy ballast also indicates poor drainage and this condition should be reported to the Foreman who will determine the method of correction.

#### 6.7 Restricted Clearances

When working on the track, make sure that tools and equipment are not too close. Generally, anything lower than 22'6" (20' in Newfoundland) is a restricted overhead clearance, and anything closer than 6' to the gauge side of the closest rail on structures higher than 4' is a restricted side clearance. Locations where clearance is restricted is indicated either by a standard restricted clearance sign, or by timetable indications, or by bulletins.

Restricted clearance spots are obviously dangerous to both cars and trainmen. Check with the Foreman about locations where clearance may be restricted and not marked.

#### 7. USE OF RADIOS AND PHONES

Radios are becoming increasingly important to the track forces. They are used by the Foreman, the Roadmaster, the Dispatcher,

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etc., and there are several channels on which to work. However, when working on the main track, the radio must be on Channel 1, which is called the "end to end" channel.

The dispatcher is called on a "Train to Dispatcher" frequency.

## 7.2 Use of a Telephone

The dispatcher's phone is not to be used by trackmen unless instructed by the Foreman to do so, or in the case of an emergency.

The Foreman will explain the proper procedure for hooking up and using a phone. The locations of dispatcher's phones are given in the timetable.

## SUMMARY

When in doubt, consult the Foreman, and always take the safe course.

## TECHNICAL REFERENCES

M/W Rules

S.P.C.'s

Plans                      Plans for Track Tools

Other                      All Maintenance of Way subjects

U.C.O.R.