

RAILROADING WITH



HAND BRAKES

A SELF-TEACHING GUIDE TO THE SAFE
OPERATION OF HAND BRAKES ON
RAILROAD FREIGHT CARS.



INTRODUCTION

This is a self-teaching manual. It is designed so that you can teach yourself the operation of hand brakes. As you go through it, check your progress by choosing right answers, filling in blanks, and the like. To give yourself a course in the operation of hand brakes, do this:

1. Read each page carefully—then fill in the blanks, or answer the questions. Do the best you can, even if you feel some of your answers may be wrong.
2. After you fill in the blanks check your answers with those shown on the back of the page.
3. If any of your answers are incorrect, **review the preceding pages covering that material.**

This book starts at a very elementary level, but covers a great deal of material in a short time. It is designed to give basic instruction to new employes, as well as help experienced employes understand the safety rules.

Most importantly, it provides supervisors an opportunity to improve their coaching skills on the operation of hand brakes and the safety rules involved.

(This manual covers only **freight car** hand brakes.)

Each railroad freight car has a hand brake. Transportation employes use the hand brake to slow down a moving car, to stop it, and to hold it in place.

Automobiles have parking brakes, or emergency brakes.

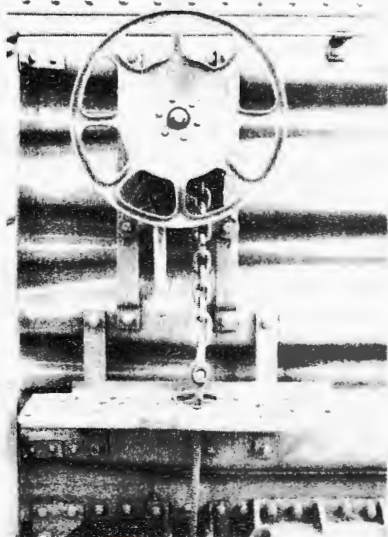
A railroad car has a h _ _ _ b _ _ _ _ .

3A

Answer: h a n d b r a k e

The three main types of hand brake are:

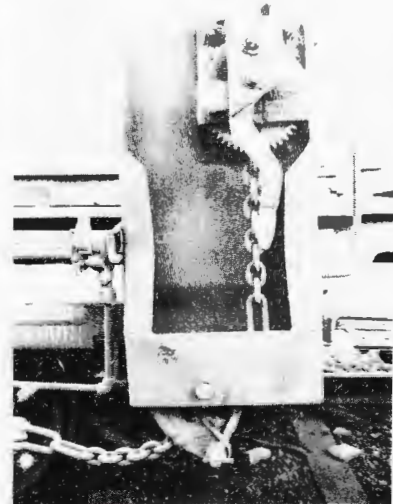
Vertical Wheel



**Shaft & Horizontal
Wheel**



**Pump Handle
(or lever)**



There are variations in the operation of hand brakes within each of the three main types. Some have OFF-ON levers, some do not. Some brake wheels spin when released; some release gradually. Some do not turn when released.

There are many different kinds of hand brakes and hand brake operating procedures. So, knowing the **kind** of brake you are operating is important; knowing **how** it **operates** is equally important.

Therefore, in order to apply and release hand brakes safely, you must know the **k i _ _** of hand brake involved and **h _ _** it **o p _ _ _ _ _**.

5A

Answer: kind

how it operates.

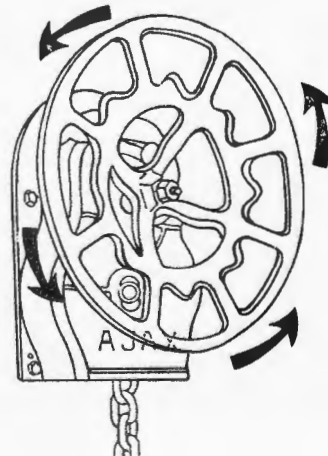
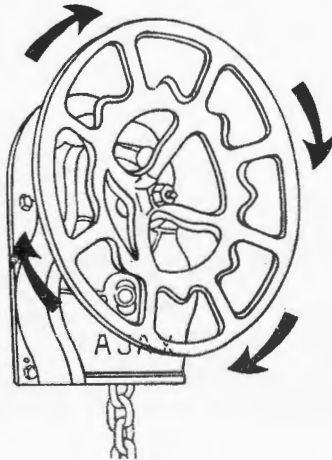
Later on we will talk about operating procedures for specific types of hand brakes. But in the beginning we will discuss basic principles for setting and releasing all hand brakes.

For example, all freight car hand brake wheels turn clockwise to set (or apply) the brakes. Which picture below shows arrows indicating clockwise direction, (a) or (b)? _____

Answer

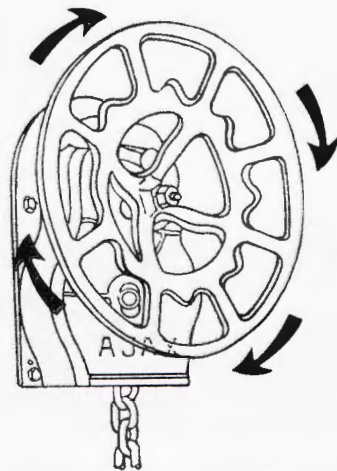
(a)

(b)



6A

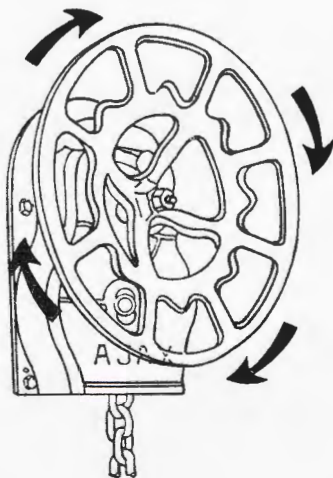
Answer: The correct answer is (a). This is **clockwise** motion. A brake wheel turned in a clockwise direction will set (or apply) the brakes.



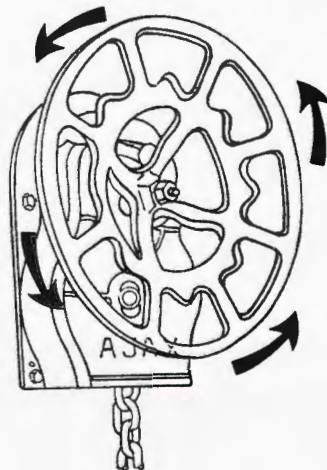
To release the brakes, hand brake wheels turn counter-clockwise. Which arrows show counter-clockwise motion, (a) or (b)? _____

Answer

(a)

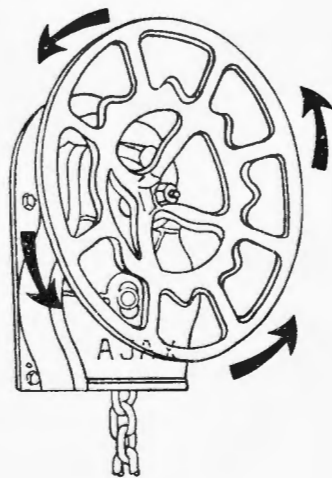


(b)



7A

Answer: Correct answer is (b).



A brake wheel turning in a **counter-clockwise** direction **releases** the brakes.

We said it was important to know the kind of hand brake and how it operates.

Another precaution that is important while operating any hand brake is to **know the right position to take**, that is, how and where to place your hands and feet.

Notice especially the positions of the hands and feet of the men in the pictures as you read this book. They always have:

- (1) Secure handholds, and
- (2) Feet firmly placed on the ladder rung and brake platform or end sill.

So far we have talked about two basic requirements for operating hand brakes safely. One concerned the hand brake, the other the man operating it. What were they?

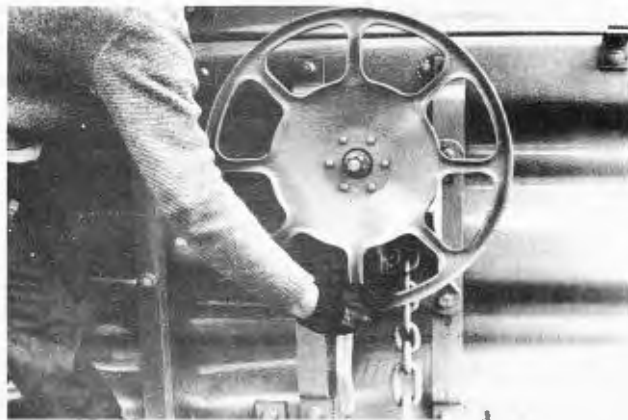
Fill in the blanks:

- (1) (About the hand brake): Know the _____ of
brake and how it _____.
- (2) (About the man): Have a se_____ handhold
and feet fi_____ placed on lad_____ rung
and brake plat_____ or e_____ sill.

Answer: The brake: Know the kind of brake and how it operates.

The man: Have a secure handhold, and feet firmly placed on ladder rung and brake platform or end sill.

A brake wheel has spokes and a rim. If the brake wheel spins or turns fast, you don't want your hand struck by a spoke. To prevent this, always grip the brake wheel rim. This is important. Keep your hands out of the line of the spokes. Always grip the _____ of the brake wheel.

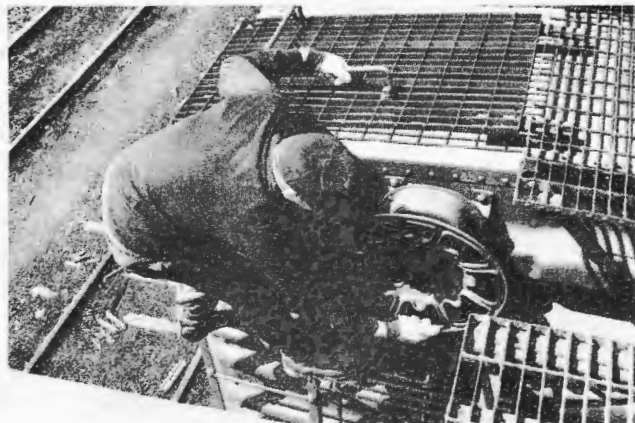


Answer: If you said RIM, you are correct.

Never pull the brake wheel by the spokes or wrap your fingers inside the rim. Always grip the brake wheel by the outside of the rim.

With one hand on the grabiron and one hand on the brake wheel rim, like this man, you exert more force and you are safe when you pull up. This man is setting the brake, so he is

turning the wheel (CLOCKWISE _____.)
(COUNTER-CLOCKWISE _____.) When he exerts
force he is pulling (UP _____.)
(DOWN _____.) [Check (✓) correct answers.]



11A

Answer: CLOCKWISE _____
COUNTER-CLOCKWISE _____

UP _____ (This is a vertical type
DOWN _____ brake.)

On a horizontal brake wheel, like this one, you have both hands on the brake wheel. When applying the brake, you push with the left hand and pull with the right hand. This method places you close to and exerting stress toward the car. Always exert stress, that is, pull and push, so your body moves toward the car.

This is one of the basic rules of safe operation of hand brakes. Make sure your body moves _____ the car, rather than away from it.



12A

Answer: toward

How many of the precautions on using a hand brake do you remember? Fill out the blanks, then check your answers on the back of the page:

When operating a hand brake, be sure you know the _____ of brake and how it _____. To apply the brake, turn the brake wheel _____. To release, turn it _____. Always have a _____ grip and _____ footing. Always grip the _____ of the brake wheel. When exerting force on vertical brake wheel, pull _____. When setting horizontal brake, exert stress _____ the car.

Answer:

When operating a hand brake, be sure you know the kind of brake and know it operates. To apply the brake, turn the brake wheel clockwise. To release, turn it counter-clockwise. Always have a secure grip and firm footing. Always grip the rim of the brake wheel. When exerting force on vertical brake wheel, pull up. When setting a horizontal brake, exert stress toward the car.

You must be sure the hand brake operates effectively before you rely on it. The only sure way to find out if it operates effectively is to:

- (a) Ask somebody. _____
- (b) Read the directions. _____ [Check (✓) the right answer.]
- (c) Test it yourself. _____

Answer: (c) Test it yourself. √

(The safety rule says "test the brake before the equipment is uncoupled." Of course, this means to test it yourself.)

The brake must be tested **while the car is still coupled** and under control of the locomotive. When the car is still **coupled**, it will not get out of control.

So always test the hand brake when the car is still

Answer: coupled, under control of a locomotive.

Some employes use a brake club to get more leverage in their pull on the brake wheel. A brake club is used only on a horizontal brake wheel, such as the one shown below.

A brake club must be of approved and authorized type. Use only a brake club issued by the Company.



Before using a brake club, make sure that it is in good condition. A brake club **cracked** or **badly worn** is not in good condition.

To be sure your brake club is in good condition, examine it before using to see that it is not _____ or
_____.

Answer: cracked badly worn

Before putting pressure on the brake club, make sure that it is firmly placed in the brake wheel with the end extending at least 6 inches beyond the shaft.

You can make sure the brake club is firmly placed by:

- a. Asking somebody. _____
- b. Testing it. _____ [Check (✓) the right answer.]
- c. Reading the manual. _____

(Be sure to verify your answer on back of this page.)

Answer: If you checked "Testing it", you are correct.

Test the brake club placement by looking at the end of the club against the shaft and applying some pressure on it.

Check now to make sure you have learned what we have just been talking about. Here's an employe using a brake club to set a hand brake equipped with a shaft and horizontal wheel. Suppose you are checking his use of the brake club. What precautions will you look for? Write them down:

1. _____

2. _____

3. _____



- Answer:
1. Is he using approved and authorized brake club?
 2. Is the brake club in good condition?
 3. Did he test to see that it is firmly placed before using?*

* Note: He tests the brake club placement by looking at the end of the club against the shaft and applying some pressure on it.

Here's a new brakeman learning to set this vertical hand brake. Suppose you are the instructor. What will you check or tell him about the precautions we have covered so far in this book? Fill in the blanks below.

Know _____ of brake and how
it _____.

To apply brake, turn brake wheel
_____.

Position of hands should be:

Left hand securely on _____;
right hand on _____.

Position of feet: Left foot firmly on
_____; right foot
firmly on _____.

When exerting force pull _____
on brake wheel. Test brake while
car is still _____.



Answer:

Know kind of brake and how it operates.

To apply brake, turn brake wheel clockwise.

Position of hands should be: Left hand securely on grab iron; right hand on rim of brake wheel.

Position of feet: Left foot firmly on ladder rung; right foot firmly on brake platform.

When exerting force pull up on brake wheel.

Test brake while car is still coupled
(under control of locomotive).

The way to **release** a hand brake depends on the type of brake. On some, simply put the ON-OFF lever in OFF position and the brake wheel spins counter-clockwise.

Here's a vertical brake wheel with ON-OFF lever. You want to release it, so you put

the lever in: ON _____

 OFF _____

and the wheel spins:

 CLOCKWISE _____

COUNTER-CLOCKWISE _____

[Check (✓) correct answers]



21A

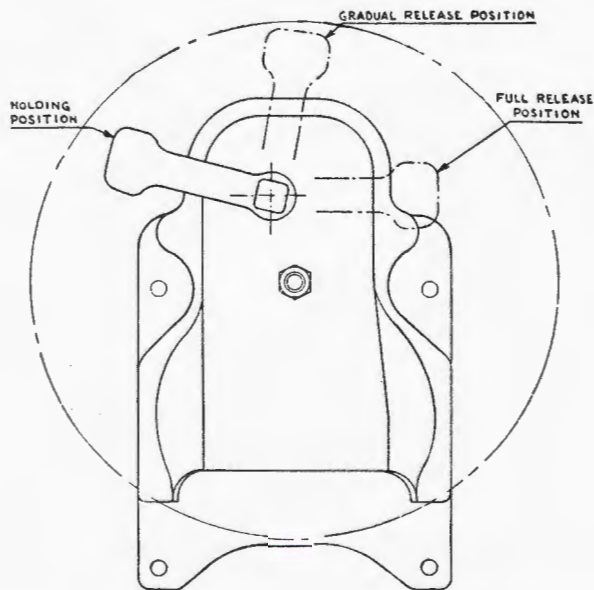
Answer:

OFF ✓

COUNTER-CLOCKWISE ✓

Some hand brakes have a gradual release position for the ON-OFF lever. Study the diagram below. With the lever in gradual release position, turn the wheel clockwise slightly, then move it counter-clockwise to release the brake gradually.

With the ON-OFF lever moved to the left, or toward you, the brake may be set and will be in holding position. With the ON-OFF lever to the right, or away from you, it is in full release position.



Here's a vertical brake wheel showing ON-OFF lever.
Is it in position to apply or release?

[Check (✓) answers]

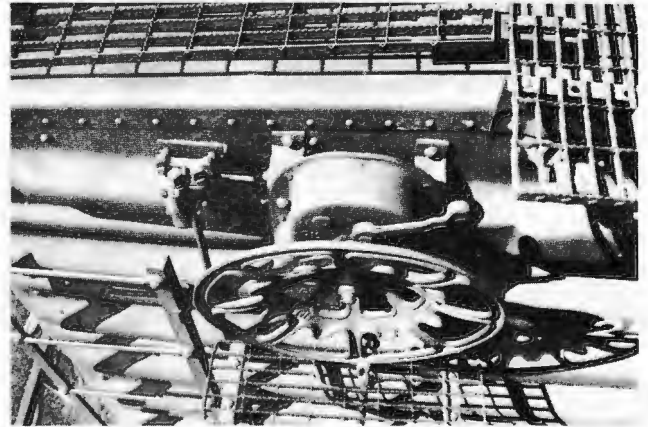
APPLY _____

RELEASE _____

Which way should the wheel turn?

CLOCKWISE _____

COUNTER-CLOCKWISE _____



23A

Answer:

RELEASE

✓

COUNTER-CLOCKWISE

✓

On some brakes, there is a gradual release without an ON-OFF lever. Pull counter-clockwise on the brake wheel to release the brake to the extent desired.

Here is a trainman **releasing** this type of hand brake. To keep clear of the spokes he is gripping the — — — of the wheel.



24A

Answer: r i m

Other vertical brake wheels release by simply lifting a lever located below the brake wheel, like this one. Lifting the lever, as this trainman is doing, releases the brake completely. The brake wheel does not turn when the lever is raised.

When he lets go of the lever the brake may be set in normal fashion. Hand brakes are set by turning the wheel:

CLOCKWISE _____

COUNTER-CLOCKWISE _____

[Check (✓) answer.]



25A

Answer: CLOCKWISE ✓

Some brake wheels spin when released, others release gradually. But to guard against any possibility of being struck by the wheel keep your hands, clothing, and all parts of your body away from the wheel. When you must move the wheel by hand during release, be sure to grip the rim only. This is not only safe, but gives more leverage and hence more force in moving the wheel.

Our new brakeman is back for a lesson on **releasing** hand brakes. What can you tell him about releasing hand brakes? How many of the precautions we have just talked about can you remember? Fill in the blanks below.

1. Some vertical hand brakes release just by putting the ON-OFF lever in _____ position.
(On or Off)

The brake wheel then s p _____.
(direction of turn)

2. On hand brakes with the gradual release feature, the position of the ON-OFF lever for gradual release is straight _____.
(Up? Down?)
3. Some hand brakes have the gradual release without an O N-O ____ lever.
4. Always grip the brake wheel by the _____.
5. Always be sure to keep _____, _____, and all parts of _____ clear of brake wheel.

Answer:

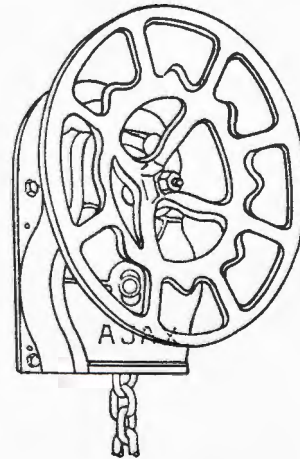
1. Some vertical hand brakes release just by putting the ON-OFF lever in OFF position.
The brake wheel then s p i n s counter-clockwise
2. On hand brakes with the gradual release feature, the position of the ON-OFF lever for gradual release is straight up.
3. Some hand brakes have the gradual release without an ON-O F F lever.
4. Always grip the brake wheel by the rim.
5. Always be sure to keep hands, clothes, and all parts of body clear of brake wheel.

If you are going to release a hand brake and ride a car down a grade, do not release the brake entirely. Release the brake only enough to let the car run; do not unwind all of the chain slack. This permits you to control or stop the car as soon as necessary.

If the hand brake releases completely, that is, has no gradual release feature, what must be done to keep the car under control? After releasing the hand brake, immediately start turning the hand brake wheel to set the brake. Take up the chain slack enough to keep the car under control.

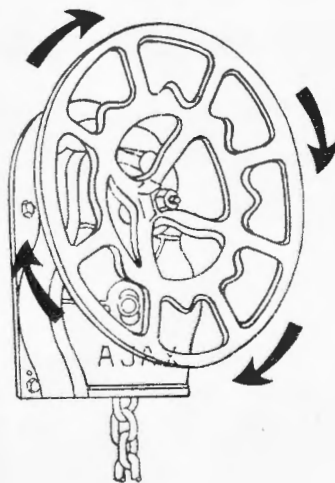
In other words, as soon as the brake has released start _____ it again.
(applying? releasing?)

In which direction do you turn the brake wheel to set it? Show by drawing arrows on the diagram.



29A

Answer: Applying, setting, winding up (or similar words)



CLOCKWISE

Don't allow the car to move with a slack chain. When setting the hand brake on a moving car, don't hesitate between the time of complete release and operating the brake wheel clockwise to take up the chain slack.

Then, when the chain slack is wound up, increase the brake wheel pressure steadily to keep the car under control.

Set the brake when the car is about to couple, which means **before** the car couples. This will permit having secure handholds, firm footing, and a stable position at the moment of impact.

A new brakeman is here for a lesson on riding a car and stopping it with the hand brake. You are coaching him. Fill in the blanks below:

1. If brake is completely released, start taking up chain slack

 (How soon?)
2. Turn brake wheel _____
 (direction?)
 to take up the chain slack.
3. To keep car under control, steadily _____
 (increase? decrease?)
 pressure on the brake wheel.
4. Set the brake _____
 (after? before?)
 car couples.
5. Grip brake wheel by the _____
6. Keep _____, _____, and all _____
 of body clear of brake wheel.



Answer:

1. If brake is completely released, start taking up chain slack immediately.
2. Turn brake wheel clockwise to take up chain slack.
3. To keep car under control, steadily increase pressure on the brake wheel.
4. Set the brake just before car couples.
5. Grip brake wheel by the rim.
6. Keep hands, clothes, and all parts of body clear of brake wheel.

Other types of hand brakes require a different method of operation. Here's the **SHAFT AND WHEEL** type hand brake. It must be released gradually, not more than **3 notches at a time**, to let the slack adjust before releasing it further as may be necessary.

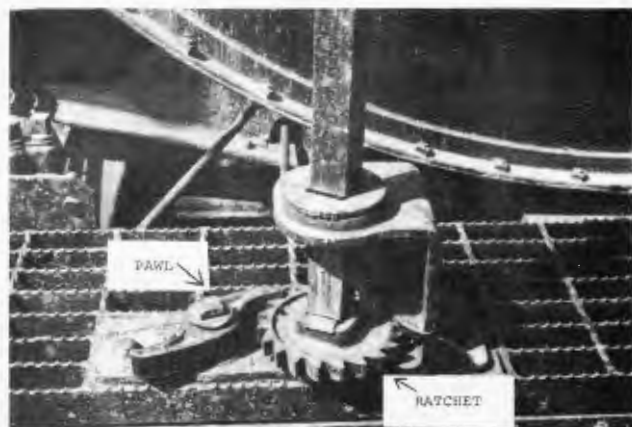
To keep the shaft and wheel from spinning, release it _____

(how?)



Answer: gradually, not more than 3 notches at a time.

To keep the shaft and wheel brake from spinning, release it gradually. To release the shaft and wheel brake gradually, pull on the brake wheel clockwise ONLY UNTIL the pawl releases. Be positioned and ready to quickly re-engage the pawl with the foot to prevent the wheel from spinning.



FILL IN THE BLANKS IN THIS STATEMENT:

On the SHAFT AND WHEEL brake, keep the wheel from spinning by releasing it _____. Pull on the brake wheel until the P_____ releases from the R A T C _____.

But be positioned and ready to quickly push the _____ into the _____ with the foot to keep the brake wheel from s _____ i n g.



Answer:

On the SHAFT AND WHEEL BRAKE, keep the wheel from spinning by releasing it gradually. Pull on the brake wheel until the P a w l releases from the R A T C h e t.

But be positioned and ready to quickly push the pawl into the ratchet with the foot to keep the brake wheel from s p i n n i n g.

As a supervisor instructing a new employe on releasing this type of hand brake, what would you be sure to tell him?

Answer: "This is a _____ and _____
brake. Release it _____, not more than _____
notches at a time, to let
the slack adjust. Pull on
the brake wheel only until
the P _ _ _ releases, but
be positioned and ready to
quickly re-engage the
_____ with the foot
to prevent the wheel from
S P _ _ N I N G."



Answer:

"This is a shaft and wheel brake. Release it gradually, not more than 3 notches at a time, to let the slack adjust. Pull on the brake wheel only until the P a w l releases, but be positioned and ready to quickly re-engage the pawl with the foot to prevent the wheel from S P I N N I N G."

Another type of brake is the lever, or PUMP HANDLE, brake.

The lever is also called a
P _____ H _____ Brake.

Always make sure the handle
stop is not broken or missing
before operating it.

(In the photograph, pencil
points to handle stop.)



Answer: P u m p H a n d l e

The pump handle brake has a short pawl lever to shift to ON and OFF positions. To apply this brake, take the proper position on the car, put pawl lever ON and pump the handle up and down.

To release this brake:

1. Put the pawl lever in **OFF** position,
2. Lift **UP** on handle far enough to release the brake,
3. Then hold the handle firmly in **DOWN** position.

(Pencil in photo points to pawl lever.)



The pump handle brake shown below is on a highway trailer transporting car.

It releases the same as the one we just described. So see if you can fill in the blanks.

To release the pump handle brake,

1. Put the pawl lever in _____
(OFF or ON)
position.
2. Lift _____ on the pump
handle far enough to release
the brake.
3. Then hold handle firmly in
_____ position.
(Up or Down)

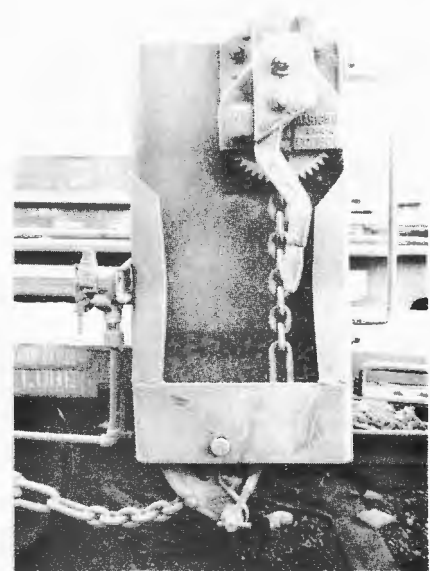


- Answer:
1. Put the pawl lever in OFF position.
 2. Lift up on the pump handle far enough to release the brake.
 3. Then hold handle firmly in down position.

(If brake does not release, put pawl lever in ON position, leave handle down, and report condition to immediate supervisor.)

Our new brakeman sure gets around. Now he's going to release this hand brake. What specific precautions should he know and follow? Fill in the blanks.

This is a _____
brake. The handle moves up and
down to apply the brake. It has
a pawl lever (or weight) with
_____ and _____ positions. To
release this brake, put the pawl
lever in _____ position, lift
_____ on handle to release brake,
then hold the handle firmly in
_____ position.



Answer: This is a pump handle (or lever) brake. The handle moves up and down to apply the brake. It has a pawl lever (or weight) with OFF and ON positions. To release this brake, put pawl lever in OFF position, lift up on handle to release brake, then hold the handle firmly in down position.

Now check your overall knowledge on the operation of hand brakes. You are about to **set** this hand brake on a **standing** car. What basic safety rules must you use?

Answer: "I must (1) make sure I know the _____ of hand brake this is and how it _____, (2) be sure to take the _____ position on the car, (3) grip the brake wheel on the _____, (4) turn the brake wheel _____ to set the brake, and (5) pull _____ on the brake wheel when exert-in force."



Answer:

"I must (1) make sure I know the kind of brake this is and how it operates, (2) be sure to take the proper position on the car, (3) grip the brake wheel on the rim, (4) turn the brake wheel clockwise to set the brake, and (5) pull up on the brake wheel when exerting force."

Now you are going to release this hand brake and ride the car down a hump to couple. What basic safety rules should you use?

Answer: "I should keep my hands, clothing, and all parts of my body clear of the brake wheel; grip brake wheel only by the

_____ ; test brake while the car is still _____ ; be sure the _____

lever is in correct position; release brake only enough to allow car to run;

turn brake wheel _____ to take up _____ ; increase pressure

_____ to keep car under _____ ; set brake _____ car couples.



Answer:

I should, (1) keep my hands, clothing, and all parts of my body clear of the brake wheel; grip brake wheel only by the rim; (2) test brake while the car is still coupled (under control of locomotive); (3) be sure the ON-OFF lever is in correct position; (4) release brake only enough to allow car to run; (5) turn brake wheel clockwise to take up chain slack; (6) increase pressure steadily to keep car under control; (7) set brake before car couples.

Important:

Be sure to go back and review the pages covering incorrect answers or answers omitted. This is for your own safety and that of your fellow employees.



COPYRIGHT, 1969