



WHEEL LACING

The same instructions will apply to any wheel provided that the correct size and length of spoke for the particular wheel to be laced are at hand.

For the Models 640 and 741B military motorcycles, the spoke requirements are:

Front Wheel

Factory No.	Spoke Diameter	Length	Quantity	To Be Used
39454	.148	$8\frac{9}{32}$	10	Hub side outside
42309	.148	$8\frac{3}{16}$	30	Hub side inside and all brake drum side
H23142	nipple	—	40	All spokes

Rear Wheel

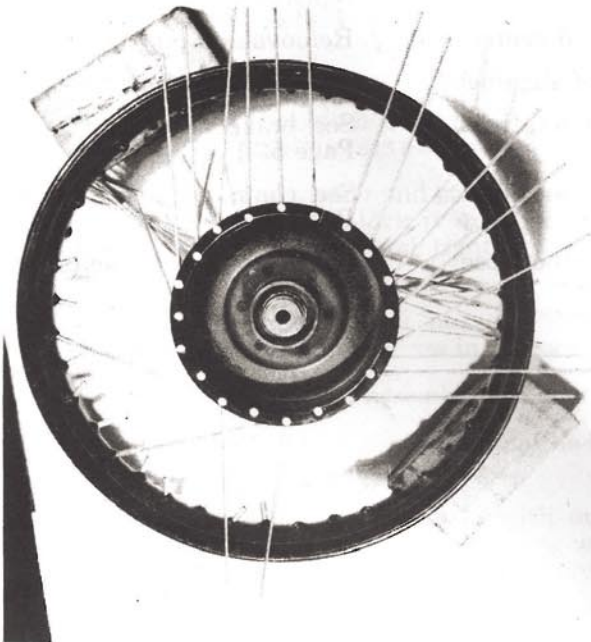
39454	.148	$8\frac{9}{32}$	10	Hub side outside
42309	.148	$8\frac{3}{16}$	10	Hub side inside
39601	.148	$8\frac{1}{2}$	20	Brake drum side
H23142	nipple	—	40	All spokes

1. Assemble the spokes to the hub first —

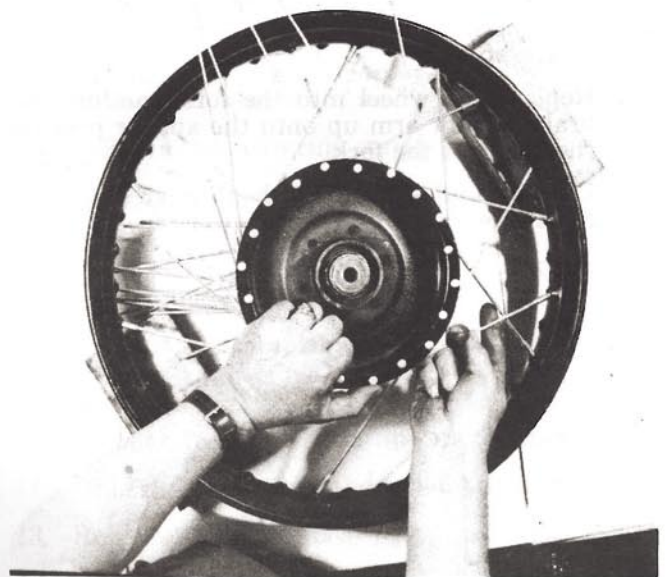
- (a) From the hub side insert the 10 outside spokes first. Slide these through from the inside toward the outside — in those holes which are countersunk on the hub inside.
- (b) From the hub side insert the 10 inside spokes next. Slide them through from the outside toward the inside. These

holes are countersunk on the outside of the hub flange.

- (c) From the brake drum side insert the 20 spokes from the outside, sliding them through from the outside to the inside.
 - (d) Bring the spokes on both sides together so that the wheel hub may be placed on the bench with the wheel hub or sprocket side on the bench, leaving the brake side facing you.
2. Now take the rim. Examine it closely. The row of nipple holes in one side are angled greater on one side than the other. The side on which they angle greatest is the brake side. You can readily see that these spokes must enter the rim at a greater angle because of the brake drum. If you cannot determine which side has the greatest angle — insert a half dozen or so nipples into the holes. These will give you a more noticeable angle to see.
 3. Face the side of the rim with the largest angle up circling the brake hub and the spokes. Center the hub to the rim.
 4. On the brake side take one of those spokes nearest you, leading from the holes nearest the drum, and bring it to the left, lining up



LACING OR SPOKING A WHEEL: The first step in lacing or spoking a wheel is to assemble the spokes to the wheel hub. The spokes on the brake drum side all thread from the outside towards the inside as shown above, with all heads facing out. On the hub side, note the countersunk holes. Every other hole is countersunk on the outside — the other holes on the inside. Lay out the wheel and rim as shown above — brake side up. Examine the rim closely — the side on which the nipple holes are angled greatest is the brake drum side.



LACING THE BRAKE DRUM SIDE OF A WHEEL: When all spokes leading to the left are in place, hold the rim firmly and twist the brake drum counterclockwise until all of the spokes just assembled are tight and straightened out. Then take any spoke leading from the outside row of holes and swing it to the right as illustrated above. This crosses over the tops of the spokes previously placed and lines up with its proper rim hole. Repeat with all outside spokes until the brake drum side is complete, nipping each spoke loosely as you go along.

WHEELS

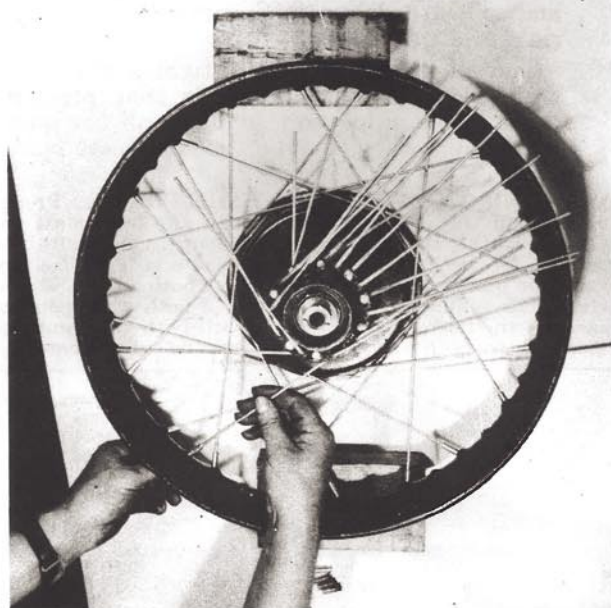
(Lacing)

spoke with any one of the holes in the top row with which it lines up.

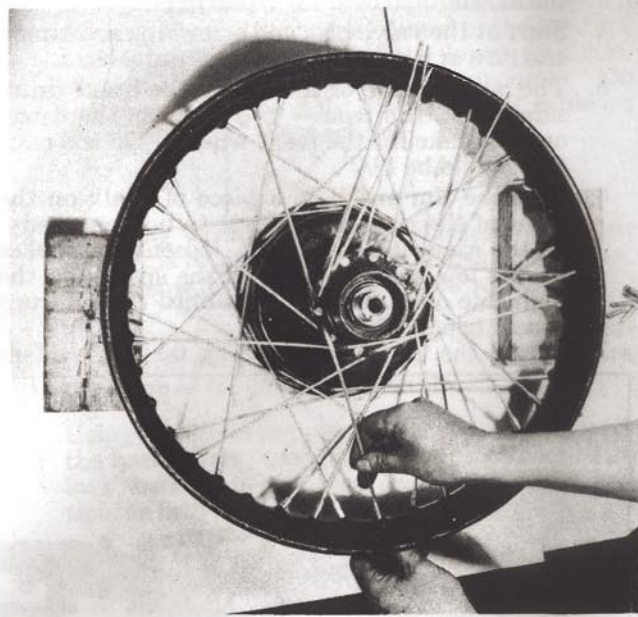
5. Take the next spoke to the left of that spoke already in place and cross it over the spoke just attached, letting it rest on the outside of the rim.
6. Take the next spoke leading from the row of holes nearest the drum and bring it to the left. This will line up with the 4th hole from the spoke just attached. Attach a nipple part way and cross the spoke from the next outside hole back over it, letting it rest on the rim.
7. Repeat operations (5) and (6) until all inside spokes are attached, connecting one inside spoke to every fourth hole.
8. When all the inside row of spokes are connected, **turn the wheel hub counterclockwise as far as it will go to straighten out the spokes just attached.**
9. Now take the outside spokes, crossing them to the right and spread them loosely around the rim.
10. Take any one and cross it over four spokes to the right and loosely connect a nipple. This may already produce a strain on the spoke being assembled.
11. Repeat operation (10) until the entire row of spokes from the outside of the drum flange are in place, crossing each one to the right over

four spokes already connected. Each will be four holes to the right from the last connected.

12. When all have been connected, turn the wheel upside down and rest on the brake drum.
13. Straighten up the spokes on the top side, arranging them loosely around the hub.
14. Take any one from the underside of the hub flange and swing it to the left, connecting it with a nipple to the hole with which it lines up on the rim.
15. Swing the next spoke, which will be one leading from the top of the flange, and swing it to the right out of the way; then take the next "underside" spoke and swing it to the left, connecting it with a nipple to the fourth hole from the previous underside spoke just connected.
16. Repeat operation (15) until all underside spokes are in place.
17. Take any one of the spokes leading from the top side of the flange and swing it to the right, connecting it to the hole with which it lines itself. This will make the spoke cross four of the other spokes that lead from the underside of this hub flange.
18. In every fourth hole to the right, connect the next spoke to the right until the wheel is completely laced.
19. The wheel is now ready for truing.

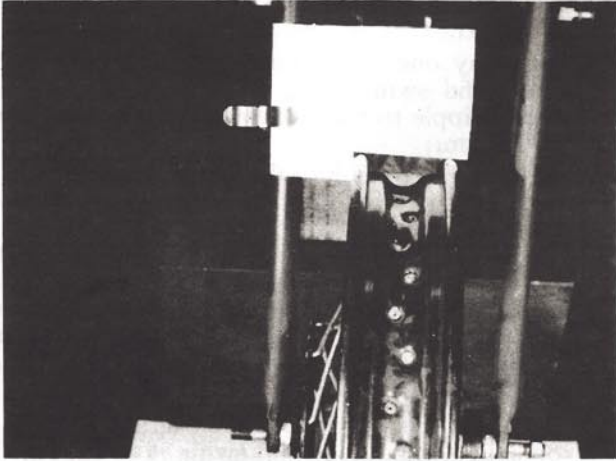


LACING THE HUB SIDE OF A WHEEL: Turn the wheel over so that the hub side faces up as illustrated. Take any one of the spokes leading from the underside of the hub and swing it to the left connecting it with a nipple in the hole with which it lines up in the rim. Swing the next spoke, which will be one leading from the top of the hub flange, to the right, out of the way. Take the next underside spoke and swing it left — lining it up every 2nd hole from the one just connected and nipple it loosely. Repeat until all of the underside spokes are in place.



LACING THE HUB SIDE OF A WHEEL: After all of the spokes leading from underneath the hub flange are in place, take any one of the remaining spokes and cross it to the right as illustrated above, until it lines up with the proper rim nipple. Do the same with all remaining spokes to finish lacing the complete wheel. On the rim inside, using a screwdriver, screw up all of the nipples, taking up a turn at a time on each spoke nipple until all are equally tightened. The wheel is now ready to be trued up.

TRUING THE WHEEL: If not properly trued, a wheel will run in a warped line or eccentric to the wheel hub. A simple method and one which is always at hand is shown above. Cut a piece of cardboard as shown and hold it to the fork using one of the pump clips. Spin the wheel. If it runs eccentric, loosen the spokes on the low side and tighten those on the high side until it runs perfectly concentric.

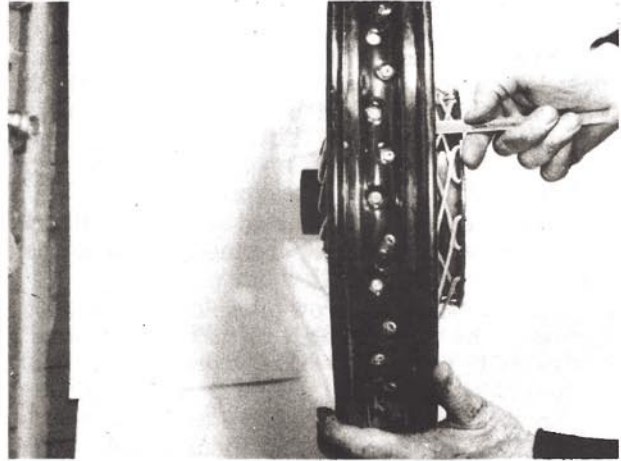


Truing the Wheel Rim

1. Insert a set of bearing races and bearings into the wheel hub.
2. Assemble the wheel hub axles complete according to instructions on pages 53-2 and 53-3.
3. If no special truing stand is available, place the wheel in the frame of a machine and tighten the axle nuts to hold the wheel in place.
4. Start at the valve hole and screw up each nipple one turn at a time until they are quite tight.
5. The outside edge of the rim on the brake drum side should run true — $1\frac{1}{8}$ " in from the flange on the brake for the front wheel. On the rear, this should be $1\frac{1}{2}$ ".
6. Spin the rim and hold a piece of chalk on the front of the rim, using a rest to hold it steady. If the rim runs eccentric, loosen the spokes on the low side and tighten the spokes on the high side one turn at a time until the rim runs concentric.
7. When the rim spins true as far as the face

LINING UP THE WHEEL HUB TO THE RIM — FRONT WHEEL: To measure the horizontal position of the hub hold a steel rule as shown in the above illustration. The flange on the brake drum should measure true $1\frac{1}{8}$ " out from the outside edge of the wheel rim.

IMPORTANT — in lining up a hub for the rear wheel, measurement should be $1\frac{1}{2}$ ".



(front) is concerned — test for warp. Spin the wheel and hold a piece of chalk in from the side on a steady rest until it begins to touch the side of the wheel.

8. Where short chalk marks are made on the wheel rim, loosen the spoke at the chalk mark and tighten the spoke on the opposite side.
9. Continue this operation until the rim is true and no high or low spots occur on the side of the rim.
10. When all spoke nipples are tight and the rim true, file off any spoke ends that protrude through the nipple so that they will not puncture a tube when tire and tube are mounted.

ALIGNING THE WHEELS TO THE FRAME: Proper handling of the motorcycle is greatly affected unless the wheels "track" straight or are lined up "true" with the frame. To check wheel alignment take a straight piece of board, or pipe, and bring it up against both front and rear wheel rims as illustrated. The rims of both wheels should parallel the board and face flush with both the front and back edges of both rims, resting against the truing board.

