

LocoGear

Technical Bulletin - 15

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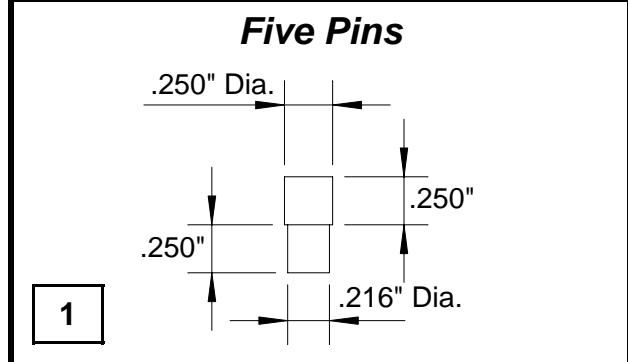
Fabricating Instructions for the Whistle Rigging Arrangement Lima Card Number 963-A-5002 Whistle Shaft Brackets Lima Card Number 962-AB-5022

The following instructions are for fabricating the Whistle Rigging Arrangement (Lima Card Number 963-A-5002) including the Whistle Hand Lever, Whistle Lever (Lima Card Number 962-A-275), and the Whistle Shaft Brackets (Lima Card Number 962-AB-5022) which were all used on the **Western Maryland Railway #6**. The Whistle Rigging was located on the inside of the Cab roof and used by the engineer to operate the locomotive whistle (see photo 3). A scale drawing of the Whistle Rigging Arrangement can be found on page 6.

Although the Whistle Rigging hangs from the inside of the cab roof on the prototype, this location is not possible on the live steam model, as the center portion of the roof is removable. This problem can be resolved by simply rotating the two end Whistle Shaft Brackets to rest on the inside front wall of the cab along with the center Whistle Shaft Bracket that was already attached to the cab wall on the prototype.

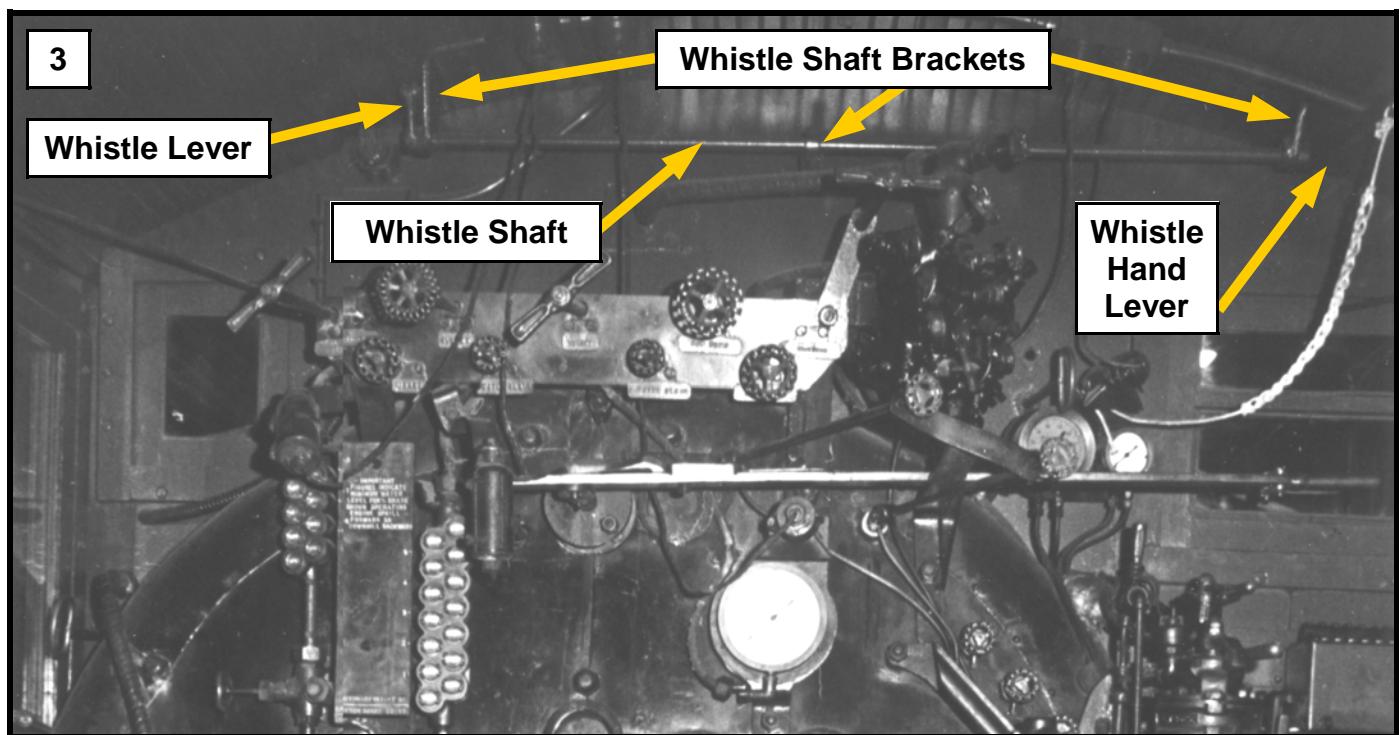
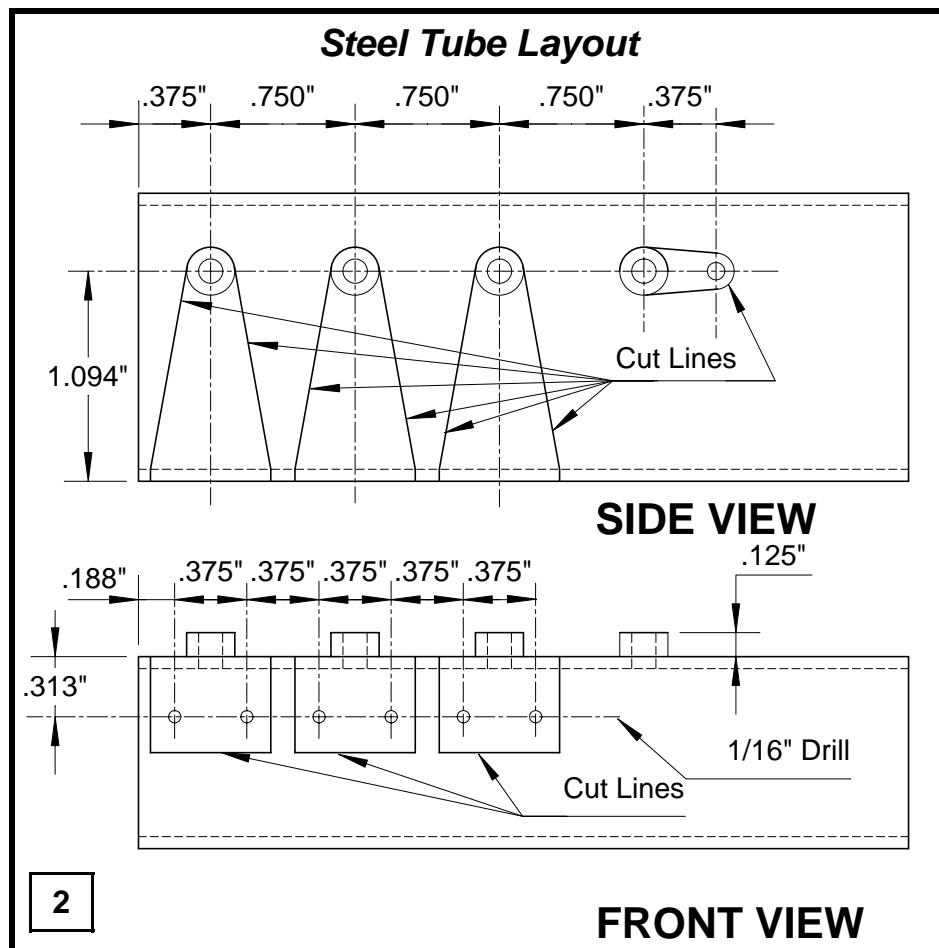
The Whistle Shaft Brackets, Whistle Hand Lever, and Whistle Lever are all made from a piece of 1" x 1½" x .063" thick wall steel tube stock about 4-5" long. Also five pins will be made from a short length of ¼" diameter cold rolled steel bar stock.

1. The first step is the make five pins from ¼" diameter cold rolled steel bar stock. Take a short length about 3-4" long and place it in a 3-jaw lathe chuck. Face off each end

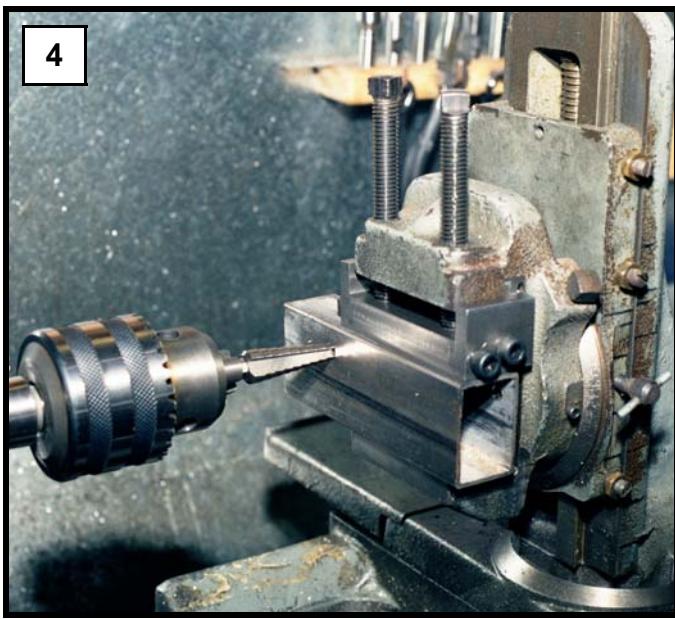


enough to get a smooth surface. Then turn down the diameter to 0.216" about ¼" in from each end. Then hack saw both ends off to a length of about ½" each. Now repeat the instructions in this step until you have at least five pins. Finally, place the small diameter end of each pin one at a time into the 3-jaw lathe chuck and face off the rough end of each pin making it smooth (see sketch 1).

2. The Whistle Shaft Brackets, Whistle Hand Lever, and Whistle Lever are all made from a piece of 1" x 1½" x .063" thick steel tube stock about 4-5" long. Square up one end of the steel tube stock and mount it in a milling vise. Drill four holes 7/32" diameter located 1.094" from one side and spaced 0.750" center to center with the first hole centered 0.375" from the square end (see sketch 2 - Side View). A step drill will make a near perfectly round hole drilling

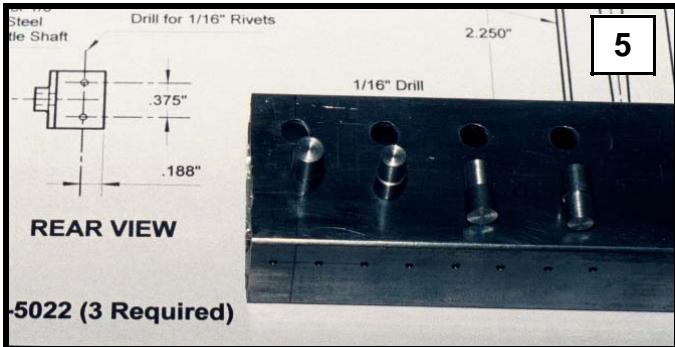


Above: This prototype photo of the inside of the cab of **Western Maryland Railway Shay #6** shows the Whistle Shaft, Brackets and Levers. Photo by Jim Salmons taken about 1982 at the Cass Shops just after the **WM #6** arrived at the Cass Scenic Railroad from the Baltimore & Ohio Railroad Museum.



through this thin material (see photo 4). Note that a standard drill bit may tend to triangulate the hole in this thin material. Check to see that the pins easily fit into these four holes with a slightly loose fit so that when brazed, the bronze will flow into the joint.

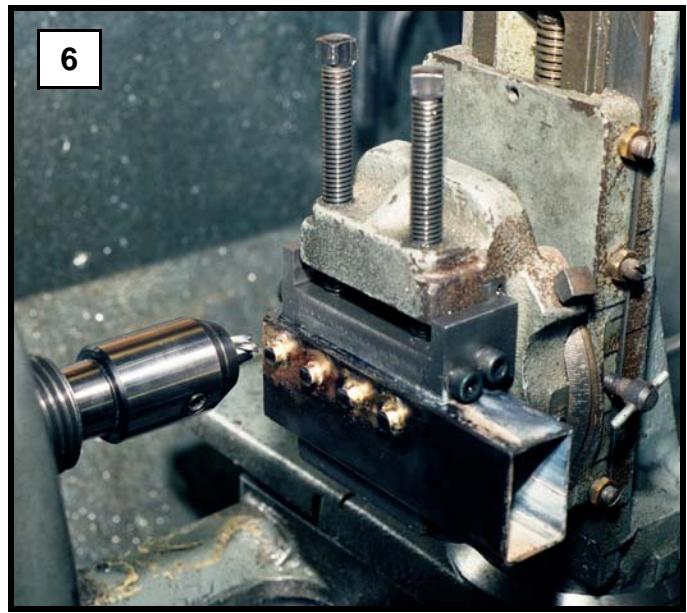
- While the steel tube is still clamped in this position, drill a fifth hole in line with the other four holes centered 0.375" from the fourth hole using a #33 drill (see sketch 2 - Side View).



- Turn the steel tube stock and drill six 1/16" diameter holes 0.375" center to center beginning with the first hole centered 0.188" from the square end and 0.313" from the corner (see sketch 2 - Front View and photo 5).
- On the opposite side of the steel tube stock from the five holes, drill the three holes in line for the Whistle Hand Lever. The center 7/32" diameter hole is drilled with the step drill. A #43 drill is used to drill a hole centered 0.625" forward from the center of the 7/32" diameter hole. This hole should also be tapped to a 4-40

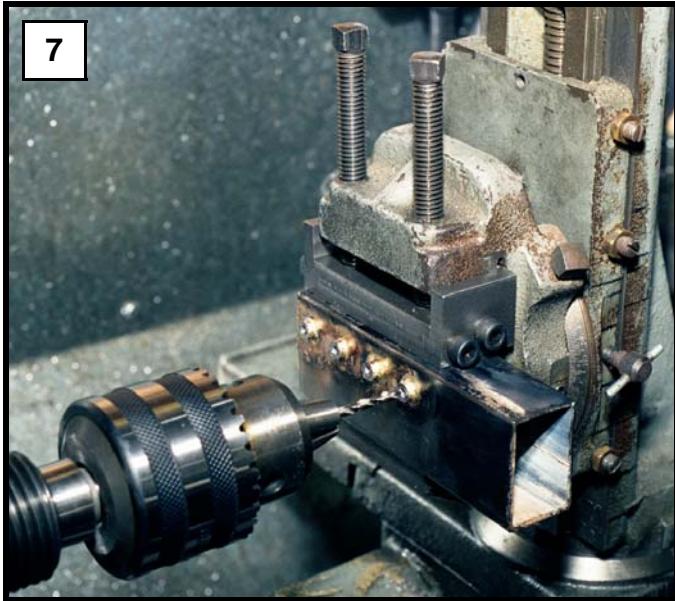
thread pitch. Finally a 1/16" diameter hole is centered 2.250" towards the rear from the center of the 7/32" center hole. This hole is used to tie the whistle cord and pull handle to the Whistle Hand Lever (see photo 3).

- Insert the four pins into the steel tube stock and braze the pins in place. Turn over the steel tube stock and braze in the fifth pin. When brazing, hold torch so the flame is pointed straight down. Swing flame around pin in a circle motion until steel tube stock gets hot enough to melt bronze brazing rod. Add just enough bronze to fill joint and to add a 1/32" radius fillet around the pin. Immediately move on to the next pin until finished. Chip away and flux and wire brush until clean.
- Clamp the Whistle Hand Lever side of the tube stock in the milling vise with the top of the pin facing out and mill the top of the pin to 0.125" above the surface of the steel tube stock.

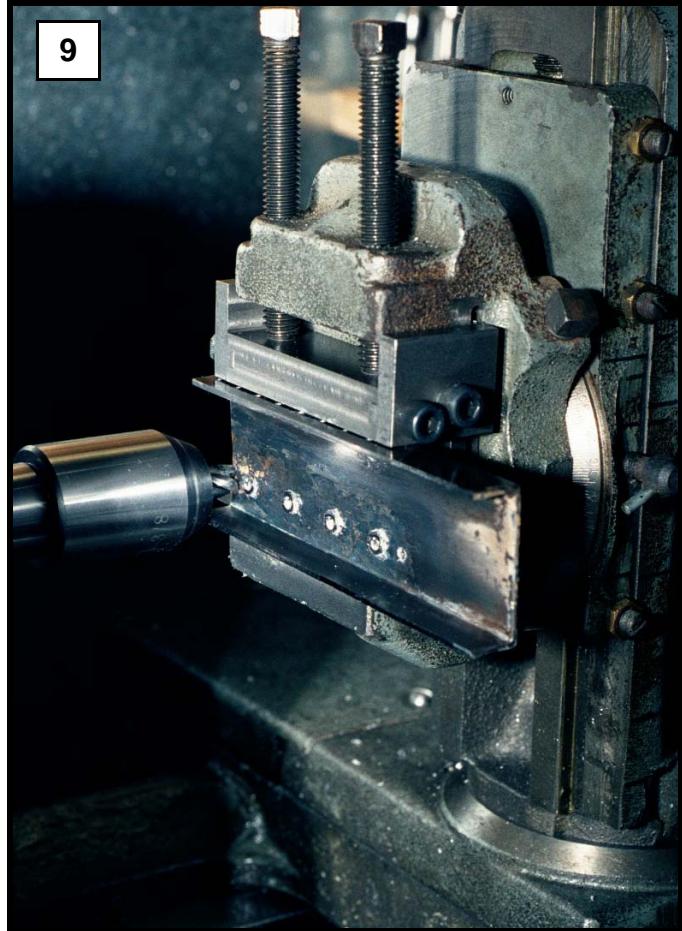


- Turn around the steel tube stock and clamp the Whistle Shaft Brackets side in the milling vise with the top of the pins facing out and mill the tops of the pins to 0.125" above the surface of the steel tube stock (see photo 6).
- With the steel tube stock still clamped in the milling vise, drill the holes for the Whistle Shaft through the center of the pins using a #28 drill. Repeat the hole pattern in step 2 used to make the four pin holes in the steel tube stock for the four Whistle Shaft holes (see photo 7 and sketch 2 - Side View).

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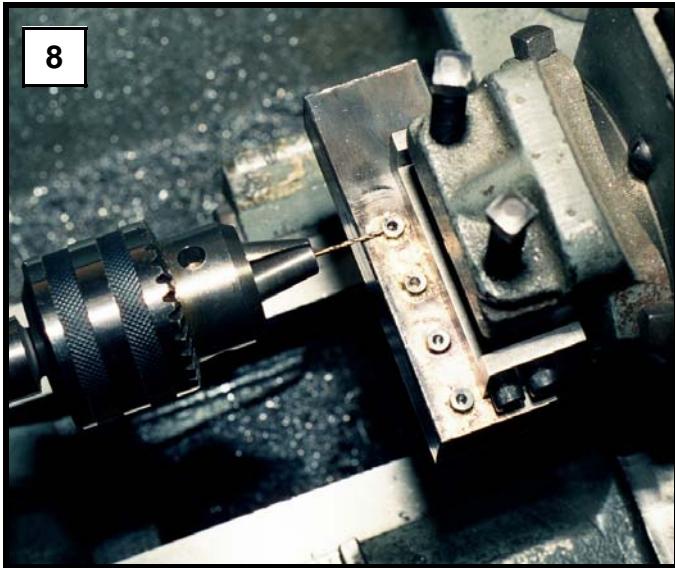


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- Turn around the steel tube stock and clamp the Whistle Hand Lever side facing out in the milling vise and drill the hole for the Whistle Shaft through the center of the pin using a #28 drill.

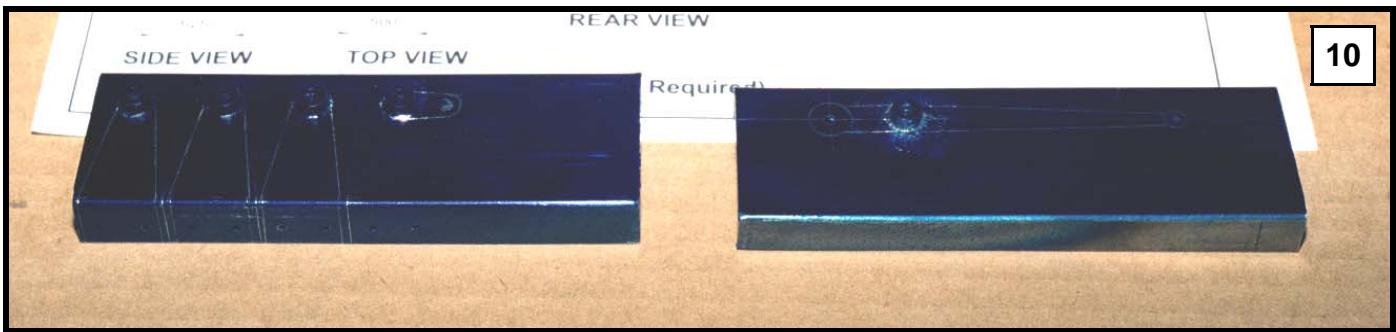
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- Clamp the steel tube stock in the milling vise and drill a $1/16"$ diameter hole through the pin for both the Whistle Hand Lever and the Whistle lever at the mid point along the side of the pins (see photo 8). These will be used later to pin the levers to the Whistle Shaft.
- Cut the steel tube stock in half, length wise along the 1" side leaving just over $1/2"$ to the side of the Whistle Shaft Brackets.
- Clamp the Whistle Shaft Brackets side of the cut tube stock in a milling vise with the tops of the pins facing away from the end mill and mill

both cut edges of the 1" side wall to 0.500" from the surface where the pins were inserted. While still clamped in place, mill off the pins that extended into the inside of the steel tube stock flush with the inside steel tube stock wall (see photo 9).

- Clamp the Whistle Hand Lever side of the cut tube stock in a milling vise with the top of the pin facing away from the end mill and mill off the pin that extends into the inside of the steel tube stock flush with the inside steel tube stock wall.
- Apply layout fluid to the two halves of the steel tube and mark out the cut lines of each of the three Whistle Shaft Brackets, the Whistle Hand Lever and the Whistle Lever (see sketch 2 and photo 10). Rough cut as close to these lines as possible with a band saw equipped with a metal cutting blade. Finish to the cut lines with hand files.
- The three Whistle Shaft Brackets are mounted horizontally in the inside front wall of the Cab. This **LocoGear Technical Bulletin** assumes that the front wall of the Cab is complete. Con-



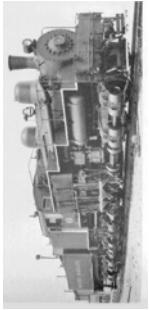
struction of the Cab is not covered in this **LocoGear Technical Bulletin**. The center of the Whistle Shaft should be 1.625" from the apex of the underside of the Cab roof. The mating surfaces of the Whistle Hand Lever and the right side Whistle Shaft Bracket should be 3.125" away from the inside of the right side wall of the Cab. Locate the six rivets holding the three Whistle Shaft Brackets to the front wall of the Cab and drill for 1/16" rivets. Rivet the Whistle Shaft Brackets on to the front wall of the Cab.

17. Next we will install the Whistle Shaft and its levers. Cut an 8½" long piece of 1/8" welding rod. Slide the Whistle Lever on to the Whistle Shaft with about 1/8" extending out the left side (see scale drawing on page 6), and clamp in a milling vise. Use the 1/16" pin hole as a drill guide to drill a 1/16" hole through the Whistle Shaft. Insert a pin made from a 16-gauge brad or escunchiuin pin. Next slide the Whistle Hand Lever on the opposite end of the Whistle Shaft similarly with about 1/8" extending out to the right. Rotate the two levers so that they have the angled alignment as shown in the scale

drawing on page 6. Clamp in a milling vise and use the 1/16" pin hole as a drill guide to drill a 1/16" hole through the Whistle Shaft. Remove the Whistle Hand Lever and slide the Whistle Shaft through the three Whistle Brackets. Reposition the Whistle Hand Lever and insert a pin made from a 16-gauge brad or escunchiuin pin (see photo 11).

This concludes the fabrication instructions to make the Whistle Rigging.





Western Maryland Railway Shay #6

Whistle Rigging Lima Card Number 963-A-5002
Whistle Shaft Brackets Lima Card Number 962-AB-5022

Drawn by John D.L. Johnson 3/4/2002
Made From Steel

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