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WESTERN MARYLAND RAILWAY COMPANY

Hagerstown - September 27, 1951

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To -General Erecting Shop Foreman, Hagerstown
 -General Roundhouse Foreman, Hagerstown
 -General Foreman, Baltimore
 -General Foreman, Hanover

From -Master Mechanic, Hagerstown

Subject -Air Chime Whistles - Diesel Locomotives

For your information, I am attaching for each of you, one (1) copy of Nathan Manufacturing Company's Field Maintenance Manual covering the air chime whistles used on a number of our Diesel Locomotives.

Please keep the Stores Department advised as to any replacement parts which you require to be carried in stock for the protection of these whistles.

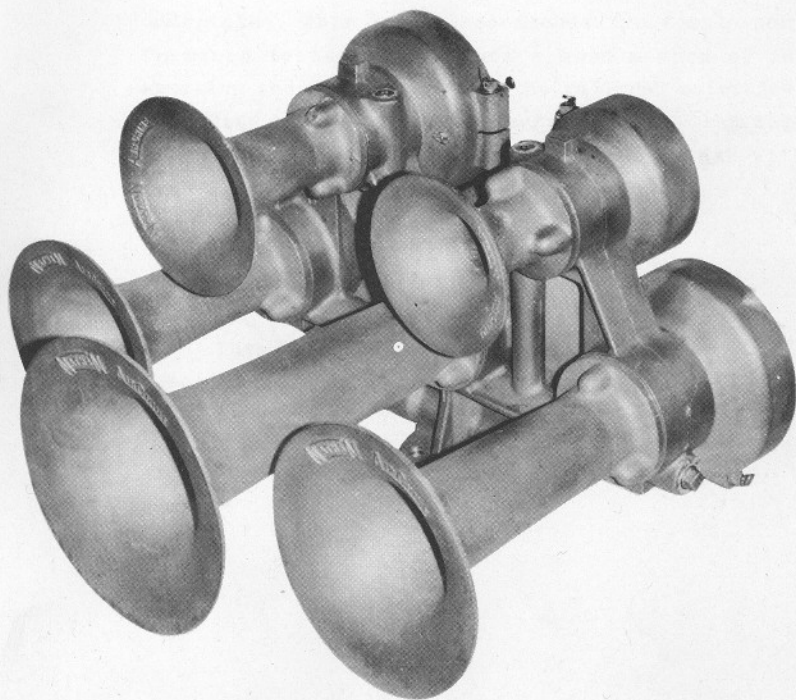
H. W. Reed ✓

cc-Mr. H. W. Gladhill

NATHAN

AIRCHIME WHISTLES

FIELD MAINTENANCE MANUAL



NATHAN MANUFACTURING COMPANY
416 East 106th Street, New York 29, N. Y.

GENERAL

For best results, longest life and lowest cost to the user, the Nathan Airchime Whistles should be inspected periodically and preventative maintenance undertaken. This manual recommends two simple performance tests and outlines a good method of inspection and repair to guide the railroad maintainer in making repairs and adjustments. Your Nathan serviceman is equipped to assist the maintainer with details beyond the scope of this manual.

WHISTLE MODELS

This manual is written to cover the tests, inspection and repair procedure of all models of the Nathan M series Airchime Whistles.

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PERIODIC INSPECTION

I. MONTHLY INSPECTION

Approximately once each month the whistles should be inspected while on the locomotive to make sure that all bells are sounding properly. The whistle cord should be pulled slowly so that each bell can be heard as it begins to speak. If in doubt as to which bell is sounding, a second man at the whistle can feel the vibration by putting his hand in front of the bell in question. This procedure should be followed for both full and soft tone. The lowest pitched bell (the longest one) should speak first and each successively higher pitched bell should speak in turn. If any of the bells fail to speak, or if they speak out of proper order, or if any note is faulty, the whistle should be checked through the Inspection and Repair Procedure. A visual check should also be made for broken or loose parts or loose mounting bolts.

II. SEMI-ANNUAL INSPECTION

Every six months or oftener as facilities permit, the speaking pressures of the various bells should be checked for proper setting. The speaking pressure is the lowest pressure at which a bell will emit the note and is obtained by cracking the air valve very slowly until the bell begins to sound. It is important to maintain speaking pressures correctly to insure maximum diaphragm life, proper sound quality and best performance at both full and soft tone.

The following test can be performed on the locomotive or by removing the whistle and mounting it on a mounting flange attached to a globe valve and connected to the shop air line (see Bench Test Diagram Fig. 1 Page 3).

1. Remove the 1/2" pipe plug from side of base and install 0-100 psi gage. A nipple 10" long between the base and gage is recommended to bring gage out where it is easy to install and read.
2. Place a piece of waste or rag loosely in all bells but the lowest tone (longest bell) and cover bell with mute. (See Fig. 2 Page 7).
3. Pull the whistle cord slowly or open the globe valve until the unmuted bell speaks. Note pressure and quality of tone.
4. Transfer rag and mute from next higher pitch bell and place on the tested bell and repeat #3.
5. Repeat #4 and #3 until all bells are tested.

The speaking pressures of the bells should be as follows:

- | | | |
|----|--------------|------------------------------|
| #1 | 14 to 15 psi | (longest and lowest pitch) |
| #2 | 15 to 16 psi | |
| #3 | 16 to 17 psi | |
| #4 | 17 to 18 psi | |
| #5 | 18 to 19 psi | (shortest and highest pitch) |

Pressures 2 or 3 psi above these limits but not below, can be permitted if they do not prevent speaking on modulated tone and if they speak in proper sequence which insures good locomotive whistle sound when blowing signals. Whistles having speaking pressures outside those limits should be checked through the Teardown Procedure.

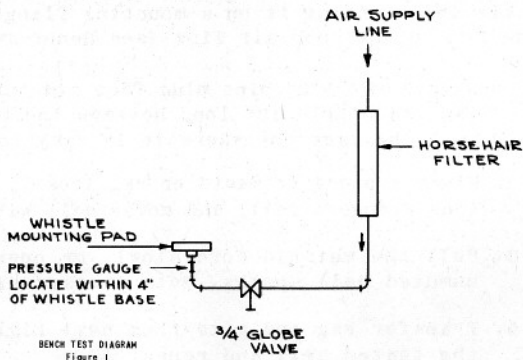
III. DISMANTLING PROCEDURE

The following procedure for dismantling, inspection and repair should be followed whenever a whistle fails to pass the Monthly Sound Test or Semi-Annual Speaking Pressure Test. If no attention has been required during the previous nine months to one year, the whistle should be inspected and repaired according to this procedure when the locomotive is shopped.

It is recommended that the whistle be removed from the locomotive and checked at a bench so that it can be properly cleaned and inspected. While it is possible to repair a whistle while on the locomotive, a better job can be done at a bench and the procedure is written for work at the bench. It is further recommended that a spare whistle plus an extra set of diaphragms be kept at each of the principle shops so that a quick replacement can be made when a whistle is found to need attention.

(a) BENCH SET-UP

The test and repair bench should have a conveniently located mounting on to which the whistle can be mounted (see Bench Test Diagram below).



A 3/4" or larger globe valve should be used close to the whistle and the air line to the valve should be 3/4" or larger depending upon the location of the air reservoir and the shop pressure. The air line should be capable of delivering 50 psi to whistle base while the whistle is blowing. It is important that the tee for the gauge connection be close to the whistle.

No special tools are required with the exception of an adjustable spanner wrench which may be standard in some shops.

(b) WHISTLE DISASSEMBLY

The disassembly procedure will describe the bell (see cross-section, Fig. 3 Page 8), but will apply to all bells and all whistles.

1. Wash the outside of the whistle thoroughly and remove any uncut sealing wires.
2. Loosen the adjusting cap clamp screw two or three turns using a hex bar wrench. This will free the adjusting cap.
3. Unscrew the adjusting cap and pick out the diaphragm assembly. Be careful to keep the adjusting cap and diaphragm head threads clean and avoid nicking the clamp rings on both the cap and head.
4. Using a socket wrench, loosen and remove the three screws holding the head, base and bell together. Remove the screw completely before separating the bell from the base and head from the base to prevent tearing gasket between base, bell and head.
5. The diffuser ring should now be loose in the head and can be picked out.
6. The seat can be removed from the head by hand, but will be snug due to "O" ring seal that will be exposed when the seat is pulled out. Do not use tool or otherwise burr the diaphragm contact surface or its edges.
7. Do not disassemble the diaphragm.
8. Depending upon the condition of the base, the various plugs can be removed to facilitate blowing out the channels.

(c) PARTS INSPECTION DIAPHRAGM

1. Look for and reject diaphragms with cracked plies or cracked clapper disc.
2. Bend the diaphragm assembly each way from flat and look for "popping" action. Discard.
3. Look for loose bolts or rivets. Tighten bolts to 4-1/2 ft. lbs. torque. Rerivet the rivet on #5 diaphragm only enough to make the assembly snug.
4. Look for diaphragm plies worn at the point of contact with the cap and head clamp rings. Discard diaphragms worn more than .010" deep. (A .010" groove is a large groove and the maintainer should lay a small wire in the groove and "mike" it until he gets experience.)

CLAMP RINGS - ADJUSTING CAP AND HEADS

1. The three clamp rings, two on the cap and one in the head, should be checked for nicks and wear. Parts with 1/16" deep or otherwise large nicks should be replaced because these waste air and impair whistle loudness. Wear of the clamp rings is detrimental depending upon the condition of the seat and clapper disc. (See notes on seat).
2. Check the large diameter threads, the condition of gasketed surfaces matching the base and the counterbore that receives the seat for damage that will prevent assembly or complete air seal.
3. Make sure vent holes (1/8" dia. drill) in the cap are open.

SEAT

1. Check the finish on the seat and if rough, lap with fine glass compound, or replace the part. The dimension from the head clamp ring to the seat and from the clapper disc face to the first ply is important. If these parts wear uniformly, considerable wear can be tolerated. If in re-assembly of the whistle, it is difficult to make the particular bell speak, check for wear at these points and replace parts as necessary.

SPECIAL NOTE:

The preceeding comments on the inspection mention all the points subject to wear or failure due to operation of the whistle. Trouble from clamp ring and seat wear will be very infrequent. About one year is expected for average diaphragm life. The other parts require only a general inspection.

(d) ASSEMBLY

1. Wash all parts if not previously cleaned.
2. Assemble all plugs in base.
3. Put the "O" ring on the seat and push both parts into the head until solid against bottom of counterbore.
4. Put diffuser disc in place and put cap screws with lock washers in place through the holes in the head.
5. Put gasket over ends of screws. NOTE: Holes are not equally spaced.

6. Put head into place against base and put gasket over screws protruding through base. NOTE: Make sure the #1 head is assembled to the #1 bore at the base, etc. See cast numbers on base, head and bell.
7. Hold bell in place and tighten the three cap screws using socket wrench to 12-15 ft. lbs. torque.
8. Repeat for all bells.
9. Put diaphragm in place and assemble the adjusting caps hand tight. Make sure threads are clean. Use wire brush as required.

(e) TEST

1. Attach whistle assembly to test flange.
2. Tighten all caps to slightly greater than working tightness. (Experience will indicate proper setting.)
3. Mute all bells but the largest bell. (See illustration on page 7.)
4. Back off cap until unmuted bell speaks at proper setting and tighten lock screw. See chart of bell speaking pressures and see trouble shooting notes. The other caps should be tight enough to prevent them from blowing when setting the largest bell.
5. Mute the bell set in Step #4, remove mute from next smaller bell and back off to proper speaking pressure and tighten lock screw. The previously set bell should blow air but the unset bells should be tight enough to prevent blowing of air.
6. Repeat 5 progressing each time to the next smaller bell.
7. Remove all mutes and blow whistle to at least 50 psi for a few seconds.
8. Recheck speaking pressures in same order as before, and make minor corrections as necessary.
9. Redrill lock wire holes through cap from hole in head and apply seal. (This adds nothing to whistle operation, but prevents unauthorized tampering if the railroad wishes to seal the whistle.)
10. Remove the whistle from the test flange and screw choke fitting in base depending upon railroad practice.
11. If the whistle is going to the store room, tape up or plug the inlet hole.

MUTES

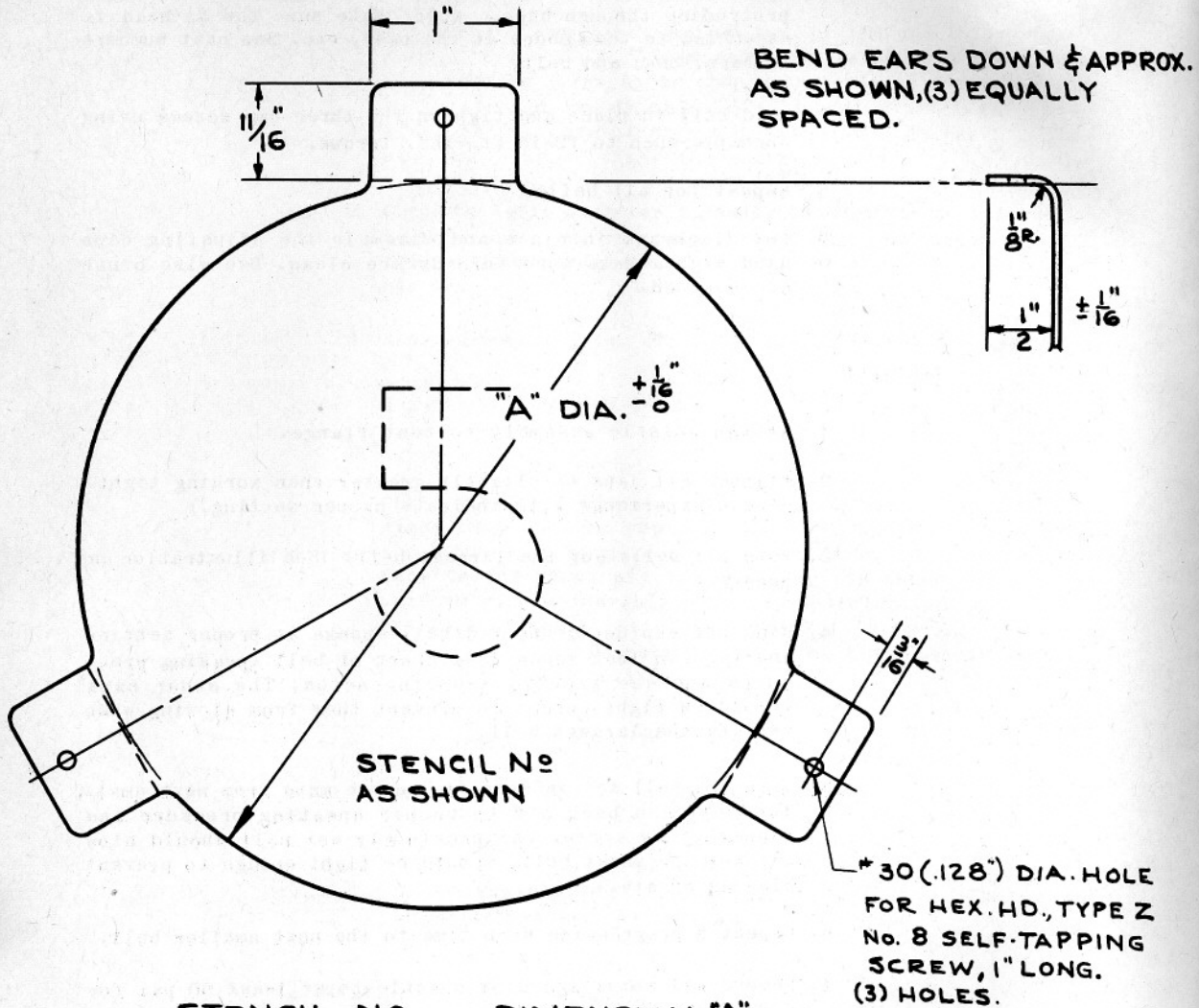


Figure 2

MATL: HEAVY GAUGE GALV. SHEET IRON.

NOTE: ROUND ALL SHARP CORNERS & SMOOTH EDGES.

(f) INSTALLING ON LOCOMOTIVE

1. Clean off mounting pad and blow out air line.
2. Inspect condition of studs, if used.
3. Bolt whistle into place using thick rubber pad or a gasket depending upon railroad practice.
4. Check full and soft tone operation.
5. Check air line filter and clean.

NOTE: If all bells fail to sound on soft tone, check pressure at base of whistle while blowing modulated, to make sure at least 20-23 psi is available. If not, check filters, whistle valve and air line for kinks or dents.

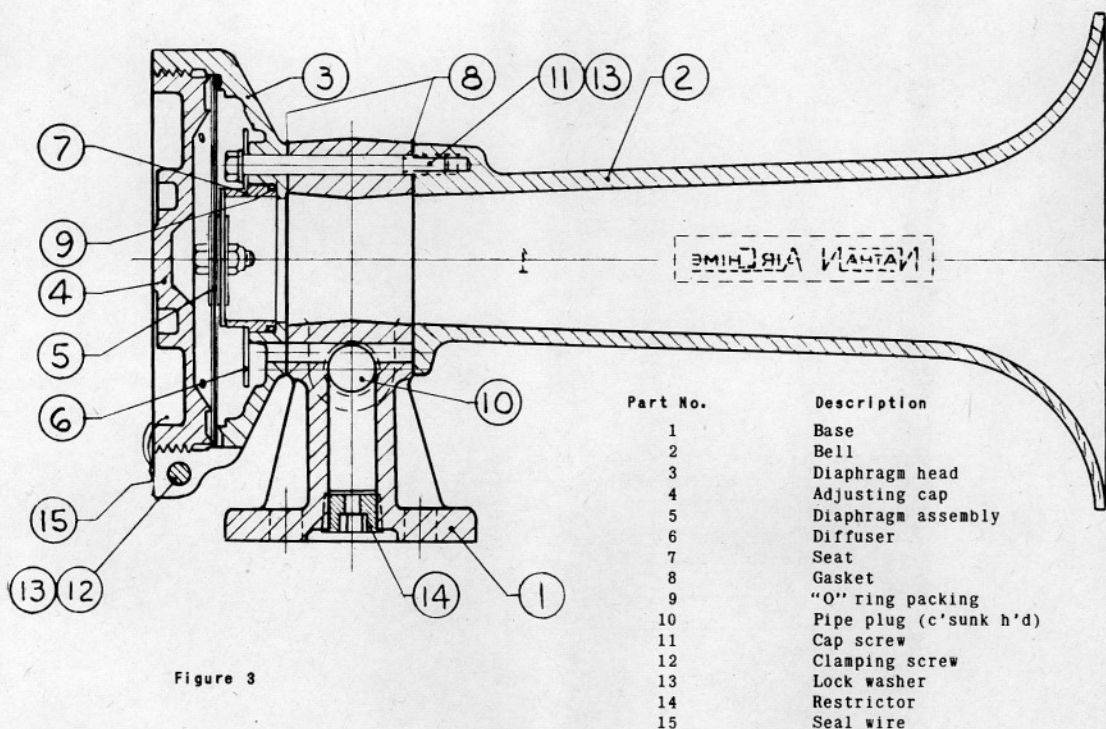


Figure 3